

## GLOSSARY AND ABBREVIATIONS

**Act:** The Clean Water Act.

**ADEC:** Alaska Department of Environmental Conservation.

**Administrator:** Administrator of the U.S. Environmental Protection Agency

**Agency:** The U.S. Environmental Protection Agency.

**Annular Injection:** Injection of fluids into the space between the drill string or production tubing and the open hole or well casing.

**Annulus or Annular Space:** The space between the drill string or casing and the wall of the hole or casing.

**AOGA:** Alaskan Oil and Gas Association.

**API:** American Petroleum Institute.

**ASTM:** American Society of Testing and Materials.

**Barite:** Barium sulfate. An additive used to increase drilling fluid density.

**Barrel (bbl):** 42 United States gallons at 60 degrees Fahrenheit.

**BAT:** The best available technology economically achievable, under Section 304(b)(2)(B) of the Clean Water Act.

**BADCT:** The best available demonstrated control technology, for new sources under Section 306 of the Clean Water Act.

**BCT:** The best conventional pollutant control technology, under Section 301(b)(2)(E) of the Clean Water Act.

**BMP:** Best Management Practices under Section 304(e) of the Clean Water Act.

**BOD:** Biochemical oxygen demand.

**BOE:** Barrels of oil equivalent. Used to put oil production and gas production on a comparable volume basis. 1 BOE = 42 gallons of diesel and 1,000 scf of natural gas = 0.178 BOE.

**BOP:** Blowout Preventer

**bpd:** Barrels per day.

**BPJ:** Best Professional Judgment.

**BPT:** The best practicable control technology currently available, under section 304(b)(1) of the Clean Water Act.

**bpy:** Barrels per year.

**Brine:** Water saturated with or containing high concentrations of salts including sodium chloride, calcium chloride, zinc chloride, calcium nitrate, etc. Produced water is often called brine.

**BTU:** British Thermal Unit.

**Casing:** Large steel pipe used to “seal off” or “shut out” water and prevent caving of loose gravel formations when drilling a well. When the casings are set and cemented, drilling continues through and below the casing with a smaller bit. The overall length of this casing is called the casing string. More than one string inside the other may be used in drilling the same well.

**CBI:** Confidential Business Information.

**Centrifuge:** Filtration equipment that uses centrifugal force to separate substances of varying densities. A centrifuge is capable of spinning substances at high speeds to obtain high centrifugal forces. Also called the shake-out or grind-out machine.

**cfd:** cubic feet per day

**CFR:** Code of Federal Regulations.

**Clean Water Act (CWA):** The Federal Water Pollution Control Act of 1972 (33 U.S.C. 1251 et seq.), as amended by the Clean Water Act of 1977 (Pub. L. 95-217) and the Water Quality Act of 1987 (Pub. L. 100-4).

**CO:** Carbon Monoxide.

**Completion:** Activities undertaken to finish work on a well and bring it to productive status.

**Condensate:** Liquid hydrocarbons which are in the gaseous state under reservoir conditions but which become liquid either in passage up the hole or in the surface equipment.

**Connate Water:** Water that was laid down and entrapped with sedimentary deposits as distinguished from migratory waters that have flowed into deposits after they were laid down.

**Conventional Pollutants:** Constituents of wastewater as determined by Section 304(a)(4) of the Act, including, but not limited to, pollutants classified as biochemical oxygen demanding, suspended solids, oil and grease, fecal coliform, and pH.

**Deck Drainage:** All wastes resulting from platform washings, deck washings, spills, rainwater, and runoff from curbs, gutters, and drains, including drip pans and wash areas.

**Depth Interval:** Interval at which a drilling fluid system is introduced and used, such as from 2,200 to 2,800 ft.

**Development Facility:** Any fixed or mobile structure addressed by this document that is engaged in the drilling of potentially productive wells.

**Dewatering Effluent:** The wastewater derived from dewatering drill cuttings.

**Diesel Oil:** The grade of distillate fuel oil, as specified in the American Society for Testing and Materials' Standard Specification D975-81.

**Disposal Well:** A well through which water (usually salt water) is returned to subsurface formations.

**DOE:** Department of Energy

**Domestic Waste:** Materials discharged from sinks, showers, laundries, and galleys located within facilities addressed by this document. Included with these wastes are safety shower and eye wash stations, hand wash stations, and fish cleaning stations.

**DMR:** Discharge Monitoring Report.

**Drill Cuttings:** Particles generated by drilling into subsurface geologic formations and carried to the surface with the drilling fluid.

**Drill Pipe:** Special pipe designed to withstand the torsion and tension loads encountered in drilling.

**Drilling Fluid:** The circulating fluid (mud) used in the rotary drilling of wells to clean and condition the hole and to counterbalance formation pressure. A water-based drilling fluid is the conventional drilling fluid in which water is the continuous phase and the suspending medium for solids, whether or not oil is present. An oil-base drilling fluid has diesel, crude, or some other oil as its continuous phase with water as the dispersed phase.

**Drilling Fluid System:** System consisting primarily of mud storage tanks or pits, mud pumps, stand pipe, kelly hose, kelly, drill string, well annulus, mud return flowline, and solids separation equipment. The primary function of circulating the drilling fluid is to lubricate the drill bit, and to carry drill cuttings rock fragments from the bottom of the hole to the surface where they are separated out.

**DWD:** Deep-water development well.

**DWE:** Deep-water exploratory well.

**Emulsion:** A stable heterogenous mixture of two or more liquids (which are not normally dissolved in each other held in suspension or dispersion, one in the other, by mechanical agitation or, more frequently, by the presence of small amounts of substances known as emulsifiers. Emulsions may be oil-in-water, or water-in-oil.

**Enhanced Mineral Oil-Based Drilling Fluid:** A drilling fluid that has an enhanced mineral oil as its continuous phase with water as the dispersed phase. Enhanced mineral oil-based drilling fluids are a subset of non-aqueous drilling fluids.

**ENR-CCI:** Engineering News Record-Construction Indices.

**EPA (or U.S. EPA):** U.S. Environmental Protection Agency.

**Exploratory Well:** A well drilled either in search of an as-yet-undiscovered pool of oil or gas (a wildcat well) or to extend greatly the limits of a known pool. It involves a relatively high degree of risk. Exploratory wells may be classified as (1) wildcat, drilled in an unproven area; (2) field extension or step-out, drilled in an unproven area to extend the proved limits of a field; or (3) deep test, drilled within a field area but to unproven deeper zones.

**Facility:** See Produced Water Separation/Treatment Facility.

**Field:** A geographical area in which a number of oil or gas wells produce hydrocarbons from an underground reservoir. A field may refer to surface area only or to underground productive formations as well. A single field may have several separate reservoirs at varying depths.

**Flocculation:** The combination or aggregation of suspended solid particles in such a way that they form small clumps or tufts resembling wool.

**Footprint:** The square footage covered by various production equipment.

**Formation:** Various subsurface geological strata.

**Formation Damage:** Damage to the productivity of a well resulting from invasion of drilling fluid particles or other substances into the formation.

**FR:** Federal Register.

**GC:** Gas Chromatography.

**GC/FID:** Gas Chromatography with Flame Ionization Detection.

**GC/MS:** Gas Chromatography with Mass Spectroscopy Detection.

**gph:** Gallons per hour.

**gpm:** Gallons per minute.

**hp:** Horsepower.

**Indirect Discharger:** A facility that introduces wastewater into a publically owned treatment works.

**Injection Well:** A well through which fluids are injected into an underground stratum to increase reservoir pressure and to displace oil, or for disposal of produced water and other wastes.

**Internal Olefin (IO):** A series of isomeric forms of  $C_{16}$  and  $C_{18}$  alkenes.

**kW:** Kilowatt.

**LC<sub>50</sub>:** The concentration of a test material that is lethal to 50% of the test organisms in a bioassay.

**LDEQ:** Louisiana Department of Environmental Quality.

**Lease:** A legal document executed between a landowner, as lessor, and a company or individual as lessee, that grants the right to exploit the premises for minerals; the instrument that creates a leasehold or working interest in minerals.

**Linear Alpha Olefin (LAO):** A series of isomeric forms of  $C_{14}$  and  $C_{16}$  monoenes.

**m:** Meters.

**mcf:** Thousand cubic feet.

**µg/l:** Micrograms per liter.

**mg/l:** Milligrams per liter.

**MDL:** Minimum detection limit

**MM:** Million.

**MMcfd:** Million cubic feet per day.

**MMS:** Department of Interior Minerals Management Service.

**MMscf:** Million standard cubic feet.

**Mscf:** Thousand standard cubic feet.

**Mud:** Common term for drilling fluid.

**Mud Pit:** A steel or earthen tank which is part of the surface drilling fluid system.

**Mud Pump:** A reciprocating, high pressure pump used for circulating drilling fluid.

**NO<sub>x</sub>:** Nitrogen Oxide.

**NODA:** Notice of Data Availability (65 FR 21559)

**Non-Aqueous Drilling Fluid:** A drilling fluid in which the continuous phase is a water-immiscible fluid such as an oleaginous material (e.g., mineral oil, enhanced mineral oil, paraffinic oil, or synthetic material such as olefins and vegetable esters).

**Nonconventional Pollutants:** Pollutants that have not been designated as either conventional pollutants or priority pollutants.

**NOIA:** National Ocean Industries Association.

**NOW:** Nonhazardous Oilfield Waste.

**NPDES:** National Pollutant Discharge Elimination System.

**NPDES Permit:** A National Pollutant Discharge Elimination System permit issued under Section 402 of the Act.

**NRDC:** Natural Resources Defense Council, Incorporated.

**NSPS:** New source performance standards under Section 306 of the Act.

**NWQEI:** Non-water quality environmental impact.

**O&M:** Operating and maintenance.

**OCS:** Offshore Continental Shelf.

**Oil-Based Drilling Fluid (OBF):** A drilling fluid that has diesel oil, mineral oil, or some other oil, but neither a synthetic material nor enhanced mineral oil, as its continuous phase with water as the dispersed phase. Oil-based drilling fluids are a subset of non-aqueous drilling fluids.

**Oil-based Pill:** Mineral or diesel oil injected into the mud circulation system as a slug, for the purpose of freeing stuck pipe.

**Offshore Development Document:** U.S. EPA, Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Offshore Subcategory of the Oil and Gas Extraction Point Source Category, Final, EPA 821-R-93-003, January 1993.

**Operator:** The person or company responsible for operating, maintaining, and repairing oil and gas production equipment in a field; the operator is also responsible for maintaining accurate records of the amount of oil or gas sold, and for reporting production information to state authorities.

**PAH:** Polynuclear Aromatic Hydrocarbon.

**Poly Alpha Olefin (PAO):** A mix mainly comprised of a hydrogenated decene dimer  $C_{20}H_{42}$  (95%), with lesser amounts of  $C_{30}H_{62}$  (4.8%) and  $C_{10}H_{22}$  (0.2%).

**POTW:** Publicly Owned Treatment Works.

**ppm:** parts per million.

**PPA:** Pollution Prevention Act of 1990.

**Priority Pollutants:** The 65 pollutants and classes of pollutants declared toxic under Section 307(a) of the Act.

**Produced Sand:** Slurried particles used in hydraulic fracturing and the accumulated formation sands and other particles that can be generated during production. This includes desander discharge from the produced water waste stream and blowdown of the water phase from the produced water treating system.

**Produced Water:** Water (brine) brought up from the hydrocarbon-bearing strata with the produced oil and gas. This includes brines trapped with the oil and gas in the formation, injection water, and any chemicals added downhole or during the oil/water separation process.

**Produced Water Separation/Treatment Facilities:** A “facility” is any group of tanks, pits, or other apparatus that can be distinguished by location, e.g., on-site/off-site or wetland/upland and/or by disposal stream (any produced water stream that is not recombined with other produced water streams for further treatment or disposal, but is further treated and/or disposed of separately). The facility may thus be, for example, an on-site tank battery, an off-site gathering center, or a commercial disposal operation. The primary focus is on treatment produced water, not on treating oil.

**Production Facility:** Any fixed or mobile facility that is used for active recovery of hydrocarbons from producing formations. The production facility begins operations with the completion phase.

**PSES:** Pretreatment Standards for Existing Sources of indirect dischargers, under Section 307(b) of the Act.

**psi:** pounds per square inch.

**psig:** pounds per square inch gauge.

**PSNS:** Pretreatment Standards for New Sources of indirect dischargers, under Section 307(b) and (c) of the Act.

**RCRA:** Resource Conservation and Recovery Act (Pub. L. 94-580) of 1976. Amendments to Solid Waste Disposal Act.

**Recompletion:** When additional drilling occurs at an existing well after the initial completion of the well and drilling waste is generated.

**Reservoir:** Each separate, unconnected body of a producing formation.

**ROC:** Retention (of drilling fluids) on cuttings.

**Rotary Drilling:** The method of drilling wells that depends on the rotation of a column of drill pipe with a bit at the bottom. A fluid is circulated to remove the cuttings.

**RPE:** Reverse Phase Extraction.

**RRC:** Railroad Commission of Texas.

**Sanitary Waste:** Human body waste discharged from toilets and urinals located within facilities addressed by this document.

**scf:** standard cubic feet.

**Shut In:** To close valves on a well so that it stops producing; said of a well on which the valves are closed.

**SIC:** Standard Industrial Classification.

**SO<sub>2</sub>:** Sulfur dioxide.

**SPP:** Suspended particulate phase.

**SWD:** Shallow-water development well.

**SWE:** Shallow-water exploratory well.

**Synthetic-Based Drilling Fluid (SBF):** A drilling fluid that has a synthetic material as its continuous phase with water as the dispersed phase. Synthetic-based drilling fluids are a subset of non-aqueous drilling fluids.

**Territorial Seas:** The belt of the seas measured from the line of ordinary low water along that portion of the coast which is in direct contact with the open sea and the line marking the seaward limit of inland waters, and extending seaward a distance of 3 miles.

**THC:** Total hydrocarbons.

**TSP:** Total suspended particulates.

**TSS:** Total Suspended Solids.

**TWC:** Treatment, workover, and completion.

**UIC:** Underground Injection Control.

**Upland Site:** A site not located in a wetland area. May be an onshore site or a coastal site under the Chapman Line definition.

**U.S.C.:** United States Code.

**USCG:** United States Coast Guard.

**USDW:** Underground Sources of Drinking Water.

**USGS:** United States Geological Survey.

**Vegetable Ester:** A monoester of 2-ethylhexanol and saturated fatty acids with chain lengths in the range  $C_8 - C_{16}$ .

**VOC:** Volatile organic carbon

**Water-Based Drilling Fluid (WBF):** A drilling fluid in which water or a water miscible fluid is the continuous phase and the suspending medium for solids, whether or not oil is present.

**Workover:** The performance of one or more of a variety of remedial operations on a producing oilwell to try to increase production. Examples of workover jobs are deepening, plugging back, pulling and resetting liners, and squeeze cementing.



## **APPENDIX VII-1**

### **SBF/OBF Model Well Drilling Waste Volumes**

**WORKSHEET No. 22:****Shallow Water Development Model Well Data: Discharged Cuttings Compostion Calculations****BPT** 10.20% Overall Cuttings Retention Number of Discharged Cuttings Waste**Wastestreams from Prim. & Sec. Shakers & FRU**

	<b>lbs</b>	<b>bbl</b>
Total Cuttings Waste Discharged =	656,659	916.8
SBF Basefluid Discharged =	66,979	239.2
SBF Water Discharged =	28,502	81.3
SBF Barite Discharged =	47,028	31.2
Dry Drill Cuttings Discharged =	514,150	565.0

Adding formation oil to whole SBF (discharged with cuttings):

	<b>lbs</b>	<b>bbls</b>
Whole SBF (discharged with cuttings) =	142,509	351.8
Formation Oil (discharged with cuttings) =	207	0.7
Whole SBF + Formation Oil =	142,716	352.5
SBF Basefluid Discharged + Formation Oil =	67,186	239.9

**BAT/NSPS Option 1** 4.03% Overall Cuttings Retention Number of Discharged Cuttings Waste**Wastestreams From Cuttings Dryer and FRU**

	<b>lbs</b>	<b>bbl</b>
Total Cuttings Waste Discharged =	562,370	684.0
SBF Basefluid Discharged =	22,664	80.9
SBF Water Discharged =	9,644	27.5
SBF Barite Discharged =	15,913	10.6
Dry Drill Cuttings Discharged =	514,150	565.0

Adding formation oil to whole SBF (discharged with cuttings):

	<b>lbs</b>	<b>bbls</b>
Whole SBF (discharged with cuttings) =	48,220	119.0
Formation Oil (discharged with cuttings) =	70	0.2
Whole SBF + Formation Oil =	48,290	119.3
SBF Basefluid Discharged + Formation Oil =	22,734	81.2

**BAT/NSPS Option 2** 3.82% Overall Cuttings Retention Number of Discharged Cuttings Waste**Wastestream from Cuttings Dryer (Discharged)**

	<b>lbs</b>	<b>bbl</b>
Total Cuttings Waste Discharged =	545,499	660.2
SBF Basefluid Discharged =	20,838	74.4
SBF Water Discharged =	8,867	25.3
SBF Barite Discharged =	14,631	9.7
Dry Drill Cuttings Discharged =	501,163	550.7

Adding formation oil to whole SBF (discharged with cuttings):

	<b>lbs</b>	<b>bbls</b>
Whole SBF (discharged with cuttings) =	44,336	109.4
Formation Oil (discharged with cuttings) =	64	0.2
Whole SBF + Formation Oil =	44,401	109.7
SBF Basefluid Discharged + Formation Oil =	20,902	74.6

**Wastestream from FRU (Not Discharged)**

	<b>lbs</b>	<b>bbls</b>
Total Cuttings Waste Not Discharged =	16,871	23.8
SBF Basefluid Not Discharged =	1,805	6.4
SBF Water Not Discharged =	768	2.2
SBF Barite Not Discharged =	1,267	0.8
Dry Drill Cuttings Not Discharged =	13,030	14.3

Adding formation oil to whole SBF (not discharged with cuttings):

	<b>lbs</b>	<b>bbls</b>
Whole SBF (not discharged with cuttings) =	3,841	9.5
Formation Oil (not discharged with cuttings) =	6	0.02
Whole SBF + Formation Oil (not discharged) =	3,846	9.50
SBF Basefluid Discharged + Formation Oil (not discharged) =	1,811	6.5

**WORKSHEET No. 23:****Shallow Water Exploratory Model Well Data: Discharged Cuttings Compostion Calculations****BPT** 10.20% Overall Cuttings Retention Number of Discharged Cuttings Waste

<b>Wastestreams from Prim. &amp; Sec. Shakers &amp; FRU</b>	<b>lbs</b>	<b>bbl</b>
Total Cuttings Waste Discharged =	1,376,078	1,921.1
SBF Basefluid Discharged =	140,360	501.3
SBF Water Discharged =	59,728	170.4
SBF Barite Discharged =	98,551	65.4
Dry Drill Cuttings Discharged =	1,077,440	1184.0

Adding formation oil to whole SBF (discharged with cuttings):

	<b>lbs</b>	<b>bbls</b>
Whole SBF (discharged with cuttings) =	298,638	737.1
Formation Oil (discharged with cuttings) =	433	1.5
Whole SBF + Formation Oil =	299,072	738.6
SBF Basefluid Discharged + Formation Oil =	140,793	502.8

**BAT/NSPS Option 1** 4.03% Overall Cuttings Retention Number of Discharged Cuttings Waste

<b>Wastestreams From Cuttings Dryer and FRU</b>	<b>lbs</b>	<b>bbl</b>
Total Cuttings Waste Discharged =	1,178,489	1,433.4
SBF Basefluid Discharged =	47,493	169.6
SBF Water Discharged =	20,210	57.7
SBF Barite Discharged =	33,346	22.1
Dry Drill Cuttings Discharged =	1,077,440	1184.0

Adding formation oil to whole SBF (discharged with cuttings):

	<b>lbs</b>	<b>bbls</b>
Whole SBF (discharged with cuttings) =	101,049	249.4
Formation Oil (discharged with cuttings) =	147	0.5
Whole SBF + Formation Oil =	101,196	249.9
SBF Basefluid Discharged + Formation Oil =	47,640	170.1

**BAT/NSPS Option 2** 3.82% Overall Cuttings Retention Number of Discharged Cuttings Waste

<b>Wastestream from Cuttings Dryer (Discharged)</b>	<b>lbs</b>	<b>bbl</b>
Total Cuttings Waste Discharged =	1,143,135	1,383.4
SBF Basefluid Discharged =	43,668	156.0
SBF Water Discharged =	18,582	53.0
SBF Barite Discharged =	30,660	20.4
Dry Drill Cuttings Discharged =	1,050,224	1154.1

Adding formation oil to whole SBF (discharged with cuttings):

	<b>lbs</b>	<b>bbls</b>
Whole SBF (discharged with cuttings) =	92,910	229.3
Formation Oil (discharged with cuttings) =	135	0.5
Whole SBF + Formation Oil =	93,045	229.8
SBF Basefluid Discharged + Formation Oil =	43,803	156.4

**Wastestream from FRU (Not Discharged)**

	<b>lbs</b>	<b>bbls</b>
Total Cuttings Waste Not Discharged =	35,355	49.9
SBF Basefluid Not Discharged =	3,783	13.5
SBF Water Not Discharged =	1,610	4.6
SBF Barite Not Discharged =	2,656	1.8
Dry Drill Cuttings Not Discharged =	27,306	30.0

Adding formation oil to whole SBF (not discharged with cuttings):

	<b>lbs</b>	<b>bbls</b>
Whole SBF (not discharged with cuttings) =	8,049	19.9
Formation Oil (not discharged with cuttings) =	12	0.04
Whole SBF + Formation Oil (not discharged) =	8,061	19.91
SBF Basefluid Discharged + Formation Oil (not discharged) =	3,795	13.6

<b>WORKSHEET No. 24:</b>		
<b>Deep Water Development Model Well Data: Discharged Cuttings Compostion Calculations</b>		
<b>BPT</b>	10.20% Overall Cuttings Retention Number of Discharged Cuttings Waste	
<b>Wastestreams from Prim. &amp; Sec. Shakers &amp; FRU</b>	<b>lbs</b>	<b>bbl</b>
Total Cuttings Waste Discharged =	993,705	1,387.3
SBF Basefluid Discharged =	101,358	362.0
SBF Water Discharged =	43,131	123.1
SBF Barite Discharged =	71,166	47.3
Dry Drill Cuttings Discharged =	778,050	855.0
Adding formation oil to whole SBF (discharged with cuttings):		
	<b>lbs</b>	<b>bbls</b>
Whole SBF (discharged with cuttings) =	215,655	532.3
Formation Oil (discharged with cuttings) =	313	1.1
Whole SBF + Formation Oil =	215,968	533.4
SBF Basefluid Discharged + Formation Oil =	101,671	363.1
<b>BAT/NSPS Option 1</b>	4.03% Overall Cuttings Retention Number of Discharged Cuttings Waste	
<b>Wastestreams From Cuttings Dryer and FRU</b>	<b>lbs</b>	<b>bbl</b>
Total Cuttings Waste Discharged =	851,020	1,035.1
SBF Basefluid Discharged =	34,296	122.5
SBF Water Discharged =	14,594	41.6
SBF Barite Discharged =	24,080	16.0
Dry Drill Cuttings Discharged =	778,050	855.0
Adding formation oil to whole SBF (discharged with cuttings):		
	<b>lbs</b>	<b>bbls</b>
Whole SBF (discharged with cuttings) =	72,970	180.1
Formation Oil (discharged with cuttings) =	106	0.4
Whole SBF + Formation Oil =	73,076	180.5
SBF Basefluid Discharged + Formation Oil =	34,402	122.8
<b>BAT/NSPS Option 2</b>	3.82% Overall Cuttings Retention Number of Discharged Cuttings Waste	
<b>Wastestream from Cuttings Dryer (Discharged)</b>	<b>lbs</b>	<b>bbl</b>
Total Cuttings Waste Discharged =	825,490	999.0
SBF Basefluid Discharged =	31,534	112.6
SBF Water Discharged =	13,419	38.3
SBF Barite Discharged =	22,141	14.7
Dry Drill Cuttings Discharged =	758,397	833.4
Adding formation oil to whole SBF (discharged with cuttings):		
	<b>lbs</b>	<b>bbls</b>
Whole SBF (discharged with cuttings) =	67,093	165.6
Formation Oil (discharged with cuttings) =	97	0.3
Whole SBF + Formation Oil =	67,190	165.9
SBF Basefluid Discharged + Formation Oil =	31,631	113.0
<b>Wastestream from FRU (Not Discharged)</b>	<b>lbs</b>	<b>bbls</b>
Total Cuttings Waste Not Discharged =	25,531	36.0
SBF Basefluid Not Discharged =	2,732	9.8
SBF Water Not Discharged =	1,162	3.3
SBF Barite Not Discharged =	1,918	1.3
Dry Drill Cuttings Not Discharged =	19,718	21.7
Adding formation oil to whole SBF (not discharged with cuttings):		
	<b>lbs</b>	<b>bbls</b>
Whole SBF (not discharged with cuttings) =	5,812	14.3
Formation Oil (not discharged with cuttings) =	8	0.03
Whole SBF + Formation Oil (not discharged) =	5,821	14.38
SBF Basefluid Discharged + Formation Oil (not discharged) =	2,740	9.8

**WORKSHEET No. 25:****Deep Water Exploratory Model Well Data: Discharged Cuttings Compostion Calculations****BPT** 10.20% Overall Cuttings Retention Number of Discharged Cuttings Waste

<b>Wastestreams from Prim. &amp; Sec. Shakers &amp; FRU</b>	<b>lbs</b>	<b>bbl</b>
Total Cuttings Waste Discharged =	2,209,396	3,084.5
SBF Basefluid Discharged =	225,358	804.9
SBF Water Discharged =	95,897	273.6
SBF Barite Discharged =	158,230	105.1
Dry Drill Cuttings Discharged =	1,729,910	1901.0

Adding formation oil to whole SBF (discharged with cuttings):

	<b>lbs</b>	<b>bbls</b>
Whole SBF (discharged with cuttings) =	479,486	1183.5
Formation Oil (discharged with cuttings) =	696	2.4
Whole SBF + Formation Oil =	480,182	1185.9
SBF Basefluid Discharged + Formation Oil =	226,054	807.2

**BAT/NSPS Option 1** 4.03% Overall Cuttings Retention Number of Discharged Cuttings Waste

<b>Wastestreams From Cuttings Dryer and FRU</b>	<b>lbs</b>	<b>bbl</b>
Total Cuttings Waste Discharged =	1,892,152	2,301.5
SBF Basefluid Discharged =	76,254	272.3
SBF Water Discharged =	32,448	92.6
SBF Barite Discharged =	53,540	35.6
Dry Drill Cuttings Discharged =	1,729,910	1901.0

Adding formation oil to whole SBF (discharged with cuttings):

	<b>lbs</b>	<b>bbls</b>
Whole SBF (discharged with cuttings) =	162,242	400.5
Formation Oil (discharged with cuttings) =	235	0.8
Whole SBF + Formation Oil =	162,477	401.3
SBF Basefluid Discharged + Formation Oil =	76,489	273.1

**BAT/NSPS Option 2** 3.82% Overall Cuttings Retention Number of Discharged Cuttings Waste

<b>Wastestream from Cuttings Dryer (Discharged)</b>	<b>lbs</b>	<b>bbl</b>
Total Cuttings Waste Discharged =	1,835,387	2,221.2
SBF Basefluid Discharged =	70,112	250.4
SBF Water Discharged =	29,835	85.1
SBF Barite Discharged =	49,227	32.7
Dry Drill Cuttings Discharged =	1,686,213	1853.0

Adding formation oil to whole SBF (discharged with cuttings):

	<b>lbs</b>	<b>bbls</b>
Whole SBF (discharged with cuttings) =	149,174	368.2
Formation Oil (discharged with cuttings) =	217	0.7
Whole SBF + Formation Oil =	149,391	368.9
SBF Basefluid Discharged + Formation Oil =	70,328	251.1

**Wastestream from FRU (Not Discharged)**

	<b>lbs</b>	<b>bbls</b>
Total Cuttings Waste Not Discharged =	56,765	80.1
SBF Basefluid Not Discharged =	6,074	21.7
SBF Water Not Discharged =	2,585	7.4
SBF Barite Not Discharged =	4,265	2.8
Dry Drill Cuttings Not Discharged =	43,842	48.2

Adding formation oil to whole SBF (not discharged with cuttings):

	<b>lbs</b>	<b>bbls</b>
Whole SBF (not discharged with cuttings) =	12,923	31.9
Formation Oil (not discharged with cuttings) =	19	0.06
Whole SBF + Formation Oil (not discharged) =	12,942	31.96
SBF Basefluid Discharged + Formation Oil (not discharged) =	6,093	21.8

**WORKSHEET No. 26:**  
**Summary Model Well Volume Data**

Waste Component	Shallow Water (1,000 ft)				Deep Water (>1,000 ft)			
	Development		Exploratory		Development		Exploratory	
	bbls	lbs	bbls	lbs	bbls	lbs	bbls	lbs
<b>BPT</b> <b>(10.20% Cuttings Retention)</b>								
SBF Basefluid Discharged	239.2	66,979	501.3	140,360	362.0	101,358	804.9	225,358
SBF Water Discharged	81.3	28,502	170.4	59,728	123.1	43,131	273.6	95,897
SBF Barite Discharged	31.2	47,028	65.4	98,551	47.3	71,166	105.1	158,230
Dry Drill Cuttings Discharged	565.0	514,150	1184.0	1,077,440	855.0	778,050	1901.0	1,729,910
Dry Drill Cut. + SBF Discharged	916.8	656,659	1921.1	1,376,078	1387.3	993,705	3084.5	2,209,396
SBF Discharged	351.8	142,509	737.1	298,638	532.3	215,655	1183.5	479,486
Formation Oil Discharged	0.7	207	1.5	433	1.1	313	2.4	696
Total Discharge - Water *	836	628,364	1,752	1,316,784	1265.3	950,887	2813.3	2,114,195
<b>BAT/NSPS Option 1</b> <b>(4.03% Cuttings Retention)</b>								
SBF Basefluid Discharged	80.9	22,664	169.6	47,493	122.5	34,296	272.3	76,254
SBF Water Discharged	27.5	9,644	57.7	20,210	41.6	14,594	92.6	32,448
SBF Barite Discharged	10.6	15,913	22.1	33,346	16.0	24,080	35.6	53,540
Dry Drill Cuttings Discharged	565.0	514,150	1184.0	1,077,440	855.0	778,050	1901.0	1,729,910
Dry Drill + SBF Discharged	684.0	562,370	1433.4	1,178,489	1035.1	851,020	2301.5	1,892,152
SBF Discharged	119.0	48,220	249.4	101,049	180.1	72,970	400.5	162,242
Formation Oil Discharged	0.2	70	0.5	147	0.4	106	0.8	235
Total Discharge - Water *	657	552,796	1,376	1,158,426	993.8	836,532	2209.7	1,859,939

\* Used in "Regional Summary" and "NSPS Regional Summary" Worksheets

Waste Component	Shallow Water (1,000 ft)				Deep Water (>1,000 ft)			
	Development		Exploratory		Development		Exploratory	
	bbls	lbs	bbls	lbs	bbls	lbs	bbls	lbs
<b>BAT/NSPS Option 2</b> <b>(3.82% Cuttings Retention)</b>								
<b>Discharge Wastes</b>								
SBF Basefluid Discharged	74.4	20,838	156.0	43,668	112.6	31,534	250.4	70,112
SBF Water Discharged	25.3	8,867	53.0	18,582	38.3	13,419	85.1	29,835
SBF Barite Discharged	9.7	14,631	20.4	30,660	14.7	22,141	32.7	49,227
Dry Drill Cuttings Discharged	550.7	501,163	1154.1	1,050,224	833.4	758,397	1853.0	1,686,213
Dry Drill + SBF Discharged	660.2	545,499	1383.4	1,143,135	999.0	825,490	2221.2	1,835,387
SBF Discharged	109.4	44,336	229.3	92,910	165.6	67,093	368.2	149,174
Formation Oil Discharged	0.2	64	0.5	135	0.3	97	0.7	217
Total Discharge - Water *	635	536,696	1,331	1,124,687	961.1	812,169	2136.8	1,805,769
<b>Zero Discharge Wastes</b>								
SBF Basefluid Not Discharged	6.4	1,805	13.5	3,783	9.8	2,732	21.7	6,074
SBF Water Not Discharged	2.2	768	4.6	1,610	3.3	1,162	7.4	2,585
SBF Barite Not Discharged	0.8	1,267	1.8	2,656	1.3	1,918	2.8	4,265
Dry Drill Cuttings Not Disch.	14.3	13,030	30.0	27,306	21.7	19,718	48.2	43,842
Dry Drill + SBF Not Discharged	23.8	16,871	49.9	35,355	36.0	25,531	80.1	56,765
SBF Not Discharged	9.5	3,841	19.9	8,049	14.3	5,812	31.9	12,923
Formation Oil Not Discharged	0.0	6	0.0	12	0.0	8	0.1	19

\* Used in "Regional Summary" and "NSPS Regional Summary" Worksheets

Total Discharge - Water *					
	SWD	SWE	DWD	DWE	
Baseline	628,364	1,316,784	950,887	2,114,195	
BAT 1	552,796	1,158,426	836,532	1,859,939	
BAT 2	536,696	1,124,687	812,169	1,805,769	
BAT 3	628,364	1,316,784	950,887	2,114,195	

**Summary Model Well Pollutant Data**

	%	lbs	%	lbs	%	lbs	%	lbs
Priority metals (from barite)		24.7		51.8		0.0		0.0
Non-conventionals (from barite)		28,805		-		-		-
Priority organics (from SBF+oil)		1.002		0.000		0.000		0.000
Non-conventionals (from SBF+oil)		29.6		-		-		-
Priority metals	0.0856%	24.7	0.1793%	51.8	0.0000%	-	0.0000%	-
Priority organics	0.00347%	1.002	0.00000%	-	0.00000%	-	0.00000%	-
Total Priority Pollutants	0.0890%	25.7	0.1793%	51.8	0.0000%	-	0.0000%	-
Non-conventionals	99.82%	28,835	0.00%	-	0.00%	-	0.00%	-
Total		28,886		104		-		-

## **APPENDIX VII-2**

### **WBF Waste Volume and Characteristics**

**WORKSHEET No. B:**
**ANALYSIS OF WBF PASS/FAIL PERMIT LIMITS (SHEEN; TOXICITY); FAILS HAULED TO ONSHORE DISPOSAL(a,b,c)**

		% Wells/region Shallow/deep % split	No lube /lube % split	No spot /spot % split	Proj'd Tox / Sheen Limit Failure Rate	Proj'd % Wells Fail Permit Lim	Proj'd % Wells Pass Permit Lim	Sum lube(s) spot(s), or lube that Pass
<b>Gulf of Mexico</b>								
shallow	(51% GOM wells) =	51.00%						
shallow, no lube	(51% * 88% all wells) =		44.88%					
shallow, no lube, no spot	(44.88% * 78% all wells do not use spot) =			35.01%	1.0%	0.350%	34.66%	
shallow, no lube, + spot	(44.88% * 22% all wells need spot) =			9.87%	33.0%	3.258%	6.62%	
shallow, + lube	(51% * 12% all wells) =		6.12%					
shallow, + lube, no spot	(6.12% * 78% all wells do not use spot) =			4.77%	33.0%	1.575%	3.20%	
shallow, + lube, + spot	(6.12% * 22% all wells need spot) =			1.35%	56.0%	0.754%	0.59%	10.41%
total % shallow wells						5.940%	45.06%	
deep	(49% GOM wells) =	49.00%						
deep, OBF (no discharge)	(15% of deep wells) =	7.35%			100%	7.35%	0.00%	
deep, WBF (discharge)	(85% of deep wells) =	41.65%						
deep, no lube	(49% * 88% all wells) =		36.65%					
deep, no lube, no spot	(43.12% * 78% all wells do not use spot) =			28.59%	1.0%	0.286%	28.30%	
deep, no lube, + spot	(43.12% * 22% all wells need spot) =			8.06%	33.0%	2.661%	5.40%	
deep, + lube	(49% * 12% all wells) =		5.00%					
deep, + lube, no spot	(6.12% * 78% all wells do not use spot) =			3.90%	33.0%	1.286%	2.61%	
deep, + lube, + spot	(6.12% * 22% all wells need spot) =			1.10%	56.0%	0.616%	0.48%	8.50%
total % deep wells			41.65%	41.65%		12.20%	36.80%	
<b>California</b>								
shallow	(58% CA wells) =	58.00%						
shallow, no lube	(58% * 88% all wells) =		51.04%					
shallow, no lube, no spot	(51.04% * 78% all wells do not use spot) =			39.81%	1.0%	0.398%	39.41%	
shallow, no lube, + spot	(51.04% * 22% all wells need spot) =			11.23%	33.0%	3.706%	7.52%	
shallow, + lube	(58% * 12% all wells) =		6.96%					
shallow, + lube, no spot	(6.96% * 78% all wells do not use spot) =			5.43%	33.0%	1.792%	3.64%	
shallow, + lube, + spot	(6.96% * 22% all wells need spot) =			1.53%	56.0%	0.857%	0.67%	11.83%
total % shallow wells						6.753%	51.25%	
deep	(42% CA wells) =	42.00%						
deep, OBF (no discharge)	(15% of deep wells) =	6.30%			100%	6.30%	0.00%	
deep, WBF (discharge)	(85% of deep wells) =	35.70%						
deep, no lube	(42% * 88% all wells) =		31.42%					
deep, no lube, no spot	(36.96% * 78% all wells do not use spot) =			24.50%	1.0%	0.245%	24.26%	
deep, no lube, + spot	(36.96% * 22% all wells need spot) =			6.91%	33.0%	2.281%	4.63%	
deep, + lube	(42% * 12% all wells) =		4.28%					
deep, + lube, no spot	(3.93% * 78% all wells do not use spot) =			3.34%	33.0%	1.103%	2.24%	
deep, + lube, + spot	(3.93% * 22% all wells need spot) =			0.94%	56.0%	0.528%	0.41%	7.28%
total % deep wells			35.70%	35.70%		10.46%	31.54%	
<b>Alaska</b>								
shallow	(41% AK wells) =	41.00%						
shallow, no lube	(41% * 88% all wells) =		36.08%					
shallow, no lube, no spot	(36.08% * 78% all wells do not use spot) =			28.14%	1.0%	0.281%	27.86%	
shallow, no lube, + spot	(36.08% * 22% all wells need spot) =			7.94%	33.0%	2.619%	5.32%	
shallow, + lube	(41% * 12% all wells) =		4.92%					
shallow, + lube, no spot	(4.92% * 78% all wells do not use spot) =			3.84%	33.0%	1.266%	2.57%	
shallow, + lube, + spot	(4.92% * 22% all wells need spot) =			1.08%	56.0%	0.606%	0.48%	8.37%
total % shallow wells						4.773%	36.23%	
deep	(59% AK wells) =	59.00%						
deep, OBF (no discharge)	(15% of deep wells) =	8.85%			100%	8.85%	0.00%	
deep, WBF (discharge)	(85% of deep wells) =	50.15%						
deep, no lube	(59% * 88% all wells) =		44.13%					
deep, no lube, no spot	(51.92% * 78% all wells do not use spot) =			34.42%	1.0%	0.344%	34.08%	
deep, no lube, + spot	(51.92% * 22% all wells need spot) =			9.71%	33.0%	3.204%	6.51%	
deep, + lube	(59% * 12% all wells) =		6.02%					
deep, + lube, no spot	(7.08% * 78% all wells do not use spot) =			4.69%	33.0%	1.549%	3.15%	
deep, + lube, + spot	(7.08% * 22% all wells need spot) =			1.32%	56.0%	0.741%	0.58%	10.23%
total % deep wells			50.15%	50.15%		14.69%	44.31%	

(a) Percentage Distribution of Water-based Drilling Fluid Types, (no oil, +MO lube, +MO spot, or +MO lube & spot)

(b) Cells shaded in blue are data input from ODD: Table XI-10, p XI-17; other percentages shown are derived from these input values)

(c) The terms "shallow" and "deep" as used in the offshore effluent limitation guideline do NOT have the same meaning as the same terms as used in the synthetics effluent guideline; these terms in the offshore rule refers to the relative target depth of the well, whereas in the synthetics rule they refer to the water depth in which operations occur.



**WORKSHEET No. C:**
**POLLUTANT LOADINGS FROM WATER-BASED DRILLING FLUID: WELL DEPTHS AND VOLUMES OF DISCHARGED CUTTINGS AND DRILLING FLUIDS**

		GOM	CA	AK	GOM	CA	AK
		Shallow Well			Deep Well		
( from ODD: Table XI-2, p XI-4)	well depth, TD	10,559	7,607	10,633	13,037	10,082	12,354
	cuttings discharged , bbl per well	1,475	1,242	1,480	2,458	1,437	2,413
( from ODD: Table XI-2, p XI-4)	drilling fluids (bbl) per well	6,938	5,939	6,963	9,752	6,777	9,458

**Current Well Counts, SBF Effluent Limitations Guideline (see "Well Count Input Sheet," this file)**

Est'd % WBF > SBF	EXISTING SOURCES, WBF Wells				NEW SOURCES, WBF Wells				Total
	GOM	CA	AK	Subtotal	GOM	CA	AK	Subtotal	
Baseline 0%	857.0	5	4	866	38	0	0	38	904
BAT 1 6%	803.0	5	4	812	35	0	0	35	847
BAT 2 6%	803.0	5	4	812	35	0	0	35	847

**WBF/Water Phase Composition/Contribution to Toxic/Non-conventional Pollutant Loadings, Offshore Record**

( from ODD: Table XI-3, p XI-5 and Table XI-6, p XI-9)

(fromODD, p XI-6)

Drilling Fluids	Composition, lbs/bbl	Total nonC+toxics+Ba
barite	98	384,792 mg/kg dry
kg/bbl tox+non-Conv		17.1 kg/bbl
lb/bbl tox+non-Conv		37.7 lb/bbl
mineral oil	9	2.9 lb/bbl
TSS	153	153.0 lb/bbl

Cuttings	
Density	543 lbs/bbl
Adherent mud 5.0%	
Mud TSS 153	lb/bbl
Ad'nt mud TSS 7.7	lb/bbl
Total TSS per bbl cuttings	551 lb/bbl

**WBF/ Mineral Oil Phase Contribution to Toxic/Non-conventional Pollutant Loadings**

( from ODD: Table XI-5, p XI-7)

MO (9 lb/bbl)	30.51 mg nonconventionals/ml MO:	0.14700 kg/bbl	non-conventional = 99.8%
	0.05 mg toxics/ml MO,	0.00024 kg/bbl	toxics = 0.2%
kg toxic+Non-conventional Pollutants per bbl MO		0.147 kg/bbl	
lbs toxic + Non-conventional Pollutants per bbl MO		0.324 lb/bbl	

461 : b/bbl mud  
 11.0 : lb/gal mud  
 2.1 : gal of 5% mud  
 23.1 : wt of 5% mud  
 543 : lb/bbl cuttings  
 566 : lb/bbl wet cuttings

## **APPENDIX VIII-1**

### **Derivation of Supply Boat Transport Days**

## **SUPPLY BOAT FREQUENCY WORKSHEET**

### **(Zero discharge)**

#### Assumptions:

1. Cuttings box capacity = 25 bbl
2. Dedicated supply boat capacity = 80 boxes
3. Regularly scheduled supply boat arrives at rig every 4 days
4. Regularly scheduled supply boat capacity = 12 boxes
5. Supply boat speed = 11.5 miles per hour
6. Platform/rig cuttings storage capacity = 12 boxes
7. Total roundtrip distance for dedicated supply boat = 277 miles  
(Port to rig = 100 mi.; rig to disposal terminal = 117 mi.; terminal to port = 60 mi.)
8. Incremental mileage for regularly scheduled supply boat = 77 miles  
(Total roundtrip - regular port to rig roundtrip = 277 - 200 = 77 mi.)
9. Supply boat maneuvering time at rig = 1 hr per trip
10. Additional boat idling at rig due to potential delays = 1.6 hrs per trip
11. Supply boat in-port unloading time and demurrage = 24 hrs per trip
12. Truck capacity = 119 bbls
13. Roundtrip trucking distance from port to disposal facility = 20 miles

#### **Deep Water Development Model Wells**

Waste volume generated = 1,387.3 bbl  
Number of boxes of waste generated =  $1387/25 = 56$  boxes  
Number of days to drill model well = 7.9 days  
Number of supply boat trips = 1 dedicated trip

Number of days for supply boat:

$(277 \text{ mi}/11.5 \text{ mi per hr}) + (1 \text{ hr maneuvering}) + (1.6 \text{ hrs add. idling at rig}) + (186.9 \text{ hrs loading}) + (24 \text{ hr demurrage}) = 237.59 \text{ hrs} = 9.90 \text{ days}$

Number of truck roundtrips =  $1387/119 = 12$  trips  
Total truck miles =  $12 * 20 = 240 \text{ mi.}$

#### **Deep Water Exploratory Model Wells**

Waste volume generated = 3,084.5 bbl  
Number of boxes of waste generated =  $3085/25 = 124$  boxes  
Number of days to drill model well = 17.5 days  
Number of supply boat trips = 2 dedicated trips; 1 regularly scheduled trip

Number of days for first dedicated supply boat:

$(277 \text{ mi}/11.5 \text{ mi per hr}) + (1 \text{ hr maneuvering}) + (1.6 \text{ hrs add. idling at rig}) + (209.1 \text{ hrs loading}) + (24 \text{ hr demurrage}) = 259.79 \text{ hrs} = 10.82 \text{ days}$

Number of days for regularly scheduled supply boat:

$(77 \text{ mi}/11.5 \text{ mi per hr}) + (1 \text{ hr maneuvering}) + (1.6 \text{ hrs add. idling at rig}) + (4 \text{ hrs loading}) + (24 \text{ hr demurrage}) = 37.30 \text{ hrs} = 1.55 \text{ days}$

Number of days for second dedicated supply boat:

$(277 \text{ mi}/11.5 \text{ mi per hr}) + (1 \text{ hr maneuvering}) + (1.6 \text{ hrs add. idling at rig}) + (199.39 \text{ hrs loading}) + (24 \text{ hr demurrage}) = 250.08 \text{ hrs} = 10.42 \text{ days}$

Supply boat days = 21.24 days for dedicated + 1.55 days for regularly scheduled = 22.79 days

Number of truck roundtrips =  $3084.5/119 = 26$  trips

Total truck miles =  $26 * 20 = 520 \text{ mi.}$

### **Shallow Water Development Model Wells**

Waste volume generated = 916.8 bbl

Number of boxes of waste generated =  $917/25 = 37$  boxes

Number of days to drill model well = 5.2 days

Number of supply boat trips = 1 dedicated trip

Number of days for supply boat:

$(277 \text{ mi}/11.5 \text{ mi per hr}) + (1 \text{ hr maneuvering}) + (1.6 \text{ hrs add. idling at rig}) + (124.8 \text{ hrs loading}) + (24 \text{ hr demurrage}) = 175.49 \text{ hrs} = 7.31 \text{ days}$

Number of truck roundtrips =  $917/119 = 8$  trips

Total truck miles =  $8 * 20 = 160 \text{ mi.}$

### **Shallow Water Exploratory Model Wells**

Waste volume generated = 1,921.1 bbl

Number of boxes of waste generated =  $1921/25 = 77$  boxes

Number of days to drill model well = 10.9 days

Number of supply boat trips = 1 dedicated trip; 1 regularly scheduled trip

Number of days for supply boat:

$(277 \text{ mi}/11.5 \text{ mi per hr}) + (1 \text{ hr maneuvering}) + (1.6 \text{ hrs add. idling at rig}) + (252.43 \text{ hrs loading}) + (24 \text{ hr demurrage}) = 303.12 \text{ hrs} = 12.63 \text{ days}$

Number of days for regularly scheduled supply boat:

$(77 \text{ mi}/11.5 \text{ mi per hr}) + (1 \text{ hr maneuvering}) + (1.6 \text{ hrs add. idling at rig}) + (4 \text{ hr loading}) + (24 \text{ hr demurrage}) = 37.30 \text{ hrs} = 1.55 \text{ days}$

Supply boat days = 12.63 days for dedicated + 1.55 days for regularly scheduled = 14.18 days

Number of truck roundtrips =  $1921/119 = 17$  trips

Total truck miles =  $17 * 20 = 340 \text{ mi.}$

## **OFFSHORE CALIFORNIA**

### Assumptions:

1. Cuttings box capacity = 25 bbl

2. Dedicated supply boat capacity = 80 boxes
3. Supply boat speed = 11.5 miles per hour
4. Platform/rig cuttings storage capacity = 12 boxes
5. Total roundtrip distance for dedicated supply boat = 200 miles  
(Port to rig = 100 mi)
6. Supply boat maneuvering time at rig = 1 hr per trip
7. Additional boat idling at rig due to potential delays = 1.6 hrs per trip
8. Supply boat in-port unloading time and demurrage = 24 hrs per trip
9. Truck capacity = 50 bbls
10. Roundtrip trucking distance from port to disposal facility = 300 miles

### **Deep Water Development Model Wells**

Waste volume generated = 1,387.3 bbl

Number of boxes of waste generated =  $1387.3/25 = 56$  boxes

Number of days to drill model well = 7.9 days

Number of supply boat trips = 1 dedicated trip

Number of days for supply boat:

$(200 \text{ mi}/11.5 \text{ mi per hr}) + (1 \text{ hr maneuvering}) + (1.6 \text{ hrs add. idling at rig}) + (186.9 \text{ hrs loading}) + (24 \text{ hr demurrage}) = 230.9 \text{ hrs} = 9.62 \text{ days}$

Number of truck roundtrips =  $1387.3/50 = 28$  trips

Total truck miles =  $28 * 300 = 8400 \text{ mi.}$

### **Shallow Water Development Model Wells**

Waste volume generated = 916.8 bbl

Number of boxes of waste generated =  $917/25 = 37$  boxes

Number of days to drill model well = 5.2 days

Number of supply boat trips = 1 dedicated trip

Number of days for supply boat:

$(200 \text{ mi}/11.5 \text{ mi per hr}) + (1 \text{ hr maneuvering}) + (1.6 \text{ hrs add. idling at rig}) + (122 \text{ hrs loading}) + (24 \text{ hr demurrage}) = 166.1 \text{ hrs} = 6.92 \text{ days}$

Number of truck roundtrips =  $917/50 = 19$  trips

Total truck miles =  $19 * 300 = 5700 \text{ mi.}$

## **SUPPLY BOAT FREQUENCY WORKSHEET**

**(Discharge cuttings with 3.82% SBF retention; zero discharge of fines)**

### **GULF OF MEXICO**

#### Assumptions:

1. Cuttings box capacity = 25 bbl
2. Dedicated supply boat capacity = 80 boxes
3. Regularly scheduled supply boat arrives at rig every 4 days
4. Regularly scheduled supply boat capacity = 12 boxes
5. Supply boat speed = 11.5 miles per hour
6. Platform/rig cuttings storage capacity = 12 boxes
7. Incremental mileage for regularly scheduled supply boat = 77 miles  
(Total roundtrip - regular port to rig roundtrip =  $277 - 200 = 77$  mi.)
8. Supply boat maneuvering time at rig = 1 hr per trip
9. Additional boat idling at rig due to potential delays = 1.6 hrs per trip
10. Supply boat in-port unloading time and demurrage = 24 hrs per trip
11. Truck capacity = 119 bbls
12. Roundtrip trucking distance from port to disposal facility = 50 miles

### **Deep Water Development Model Wells**

Waste volume generated = 23.8 bbl

Number of boxes of waste generated =  $23.8/25 = 1$  box

Number of days to drill model well = 7.9 days

Number of supply boat trips = 1 regularly scheduled trip

Number of days for supply boat:

$(77 \text{ mi}/11.5 \text{ mi per hr}) + (1 \text{ hr maneuvering}) + (1.6 \text{ hrs add. idling at rig}) + (0.1 \text{ hrs loading}) + (24 \text{ hr demurrage}) = 33.30 \text{ hrs} = 1.40 \text{ days}$

Number of truck roundtrips =  $23.8/119 = 1$  trip

Total truck miles =  $1 * 50 = 50$  mi.

### **Deep Water Exploratory Model Wells**

Waste volume generated = 49.9 bbl

Number of boxes of waste generated =  $49.9/25 = 2$  boxes

Number of days to drill model well = 17.5 days

Number of supply boat trips = 1 regularly scheduled trip

Number of days for regularly scheduled supply boat:

$(77 \text{ mi}/11.5 \text{ mi per hr}) + (1 \text{ hr maneuvering}) + (1.6 \text{ hrs add. idling at rig}) + (0.2 \text{ hr loading}) + (24 \text{ hr demurrage}) = 33.50 \text{ hrs} = 1.40 \text{ days}$

Number of truck roundtrips =  $49.9/119 = 1$  trip

Total truck miles =  $1 * 50 = 50$  mi.

### **Shallow Water Development Model Wells**

Waste volume generated = 36 bbl

Number of boxes of waste generated =  $36/25 = 2$  boxes

Number of days to drill model well = 5.2 days

Number of supply boat trips = 1 regularly scheduled trip

Number of days for supply boat:

$(77 \text{ mi}/11.5 \text{ mi per hr}) + (1 \text{ hr maneuvering}) + (1.6 \text{ hrs add. idling at rig}) + (0.2 \text{ hr loading}) + (24 \text{ hr demurrage}) = 33.50 \text{ hrs} = 1.40 \text{ days}$

Number of truck roundtrips =  $36/119 = 1$  trip

Total truck miles =  $1 * 50 = 50 \text{ mi.}$

### **Shallow Water Exploratory Model Wells**

Waste volume generated = 80.1 bbl

Number of boxes of waste generated =  $80.1/25 = 4$  boxes

Number of days to drill model well = 10.9 days

Number of supply boat trips = 1 regularly scheduled trip

Number of days for regularly scheduled supply boat:

$(77 \text{ mi}/11.5 \text{ mi per hr}) + (1 \text{ hr maneuvering}) + (1.6 \text{ hrs add. idling at rig}) + (0.4 \text{ hr loading}) + (24 \text{ hr demurrage}) = 33.70 \text{ hrs} = 1.40 \text{ days}$

Number of truck roundtrips =  $80.1/119 = 1$  trip

Total truck miles =  $1 * 50 = 50 \text{ mi.}$

## **APPENDIX VIII-2<sup>a</sup>**

### **Cost (Savings) Analysis Worksheets**

- 
- a. Chapter VIII states:
- Worksheets 20 through 22 are WBF Zero Discharge baseline costs for the Gulf of Mexico, offshore California, and Cook Inlet, Alaska, respectively, including costs for transport and land disposal and for onsite injection.
  - Worksheets 20A and 22A are WBF Zero Discharge BAT/NSPS Option 1 and BAT/NSPS Option 2 costs for the Gulf of Mexico (costs for transport and land disposal and for onsite injection) and for Cook Inlet, Alaska (onsite injection), respectively.

In this Appendix, the contents of these worksheets are as follows:

- Worksheets 20 and 21 are WBF Zero Discharge baseline costs for the Gulf of Mexico and offshore California, respectively, including costs for transport and land disposal; Worksheet 22 has been deleted because land disposal is not current waste management practice in Cook Inlet, Alaska.
- Worksheets 20A through 22A are WBF Zero Discharge BAT/NSPS Option 1 and BAT/NSPS Option 2 costs for the Gulf of Mexico, offshore California, and Cook Inlet, Alaska for onsite injection, respectively.



## WORKSHEET A: SBF Cost Model Input Data

### MODEL WELL WASTE DATA

Waste	DWD	DWE	SWD	SWE
BPT (Retention = 9.42%; Volumes (bbl); Worksheets 1-3)				
Wet cuttings	1,387	3,085	917	1,921
DF Lost w/ Cuttings	532	1,184	352	737
BAT 1 (Retention =3.68%; Volumes (bbl); Worksheets 7-9)				
Wet cuttings	1,035	2,301	684	1,433
DF Lost w/ Cuttings	180	400	119	249
BAT 2 (Retention =3.48%; Volumes (bbl); Worksheets 7-9)				
Part A: 97% (vol) of Waste is Discharged Cuttings from Cuttings Dryer				
Wet cuttings	999	2,221	660	1,383
DF Lost w/ Cuttings	166	368	109	229
Part B: 3% (vol) of Waste is Fines Retained for Zero Discharge				
Wet cuttings	36	80	24	50
DF Lost w/ Fines	14	32	9	20
BAT-3 (Zero Discharge) Volumes (bbl): Worksheets 10-12				
Wet cuttings	1,387	3,085	917	1,921
DF Lost w/ Cuttings	532	1,184	352	737
Length of SBF Drilling Program , in Days				
All wastes	8	18	5	11
SBF Retention on Cuttings, % Wet Weight Cuttings				
BPT (Baseline)	10.20%	10.20%	10.20%	10.20%
BAT/NSPS Option 1 (Two Discharges):	4.03%	4.03%	4.03%	4.03%
BAT/NSPS Option 2 (One Discharge):	3.82%	3.82%	3.82%	3.82%

### MISCELLANEOUS COST DATA

Geographic multiplier, CA::GOM =	1.6
Geographic multiplier, AK::GOM =	2.0
ENR CCI 1999\$/1995\$ Ratio =	1.108

### SUMMARY OF SUPPLY BOAT INFORMATION

(N. Orentas Memo, 2/23/00)

		BPT (CA & AK) and Zero Discharge (GOM)				BAT Option 2B (ZD Fines)			
		DWD	DWE	SWD	SWE	DWD	DWE	SWD	SWE
<b>GULF OF MEXICO OPERATIONS</b>									
No. Supply Boat Trips									
	Dedicated trips	1	2	1	1	0	0	0	0
	Regularly-scheduled trip[s]	0	1	0	1	1	1	1	1
	Total Trips	1	3	1	2	1	1	1	1
<b>No. days, supply boats hauling waste ashore</b>		<b>9.90</b>	<b>22.79</b>	<b>7.31</b>	<b>14.18</b>	<b>9.90</b>	<b>22.79</b>	<b>7.31</b>	<b>14.18</b>
<b>CALIFORNIA OPERATIONS</b>									
No. Supply Boat Trips									
	Dedicated trips	1	NA	1	NA	0	0	0	0
	Regularly-scheduled trip[s]	0	NA	0	NA	1	NA	1	NA
	Total Trips	1	NA	1	NA	1	0	1	0
<b>No. days, supply boats hauling waste ashore</b>		<b>9.62</b>	<b>NA</b>	<b>6.92</b>	<b>NA</b>	<b>9.62</b>	<b>NA</b>	<b>6.92</b>	<b>NA</b>
<b>LASKA (COOK INLET) OPERATIONS (No longer applicable)</b>									
No. Supply Boat Trips									
	Dedicated trips	NA	NA	NA	NA	NA	NA	NA	NA
	Regularly-scheduled trip[s]	NA	NA	NA	NA	NA	NA	NA	NA
	Total Trips	NA	NA	NA	NA	NA	NA	NA	NA
<b>No. days, supply boats hauling waste ashore</b>		<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>

BASELINE GULF OF MEXICO OPERATIONS				Zero Discharge GOM Disposal Inputs			
				DWD	DWE	SWD	SWE
UNIT COSTS				Container Rental	\$25	\$25	\$25
Cost per bbl SBF	\$221.00	Boxes per well		59	131	39	82
Cost per bbl OBF	\$79.00						
Cost per SBF Toxicity Test	\$575	Days to fill & haul		9.90	22.79	7.31	14.18
Cost per day, supply boat	\$8,500			23.508	23.550	23.513	23.427
Cost per day, onsite injection system	\$4,280						
POLLUTION CONTROL SELECTION RATIOS							
Wells currently using OBF: haul vs inject			NA	NA	NA	NA	
Wells currently using OBF: convert to SBF vs remain OBF >>>			NA	NA	NA	NA	
BASELINE CALIFORNIA OPERATIONS							
UNIT COSTS							
Disposal Cost	\$12.53	per bbl	Vendor quote: \$35.00 per ton and 917 lbs waste cuttings per bbl				
Handling Cost	\$5.89	per bbl	Basis: apply F125GOM handling costs = 47% of total GOM disposal costs				
Container Rental	\$40.00	per box per day	GOM vendor quote (\$25 per day) times geographic area multiplier (CA:GOM = 1.6)				
			58	per DWD	39	per SWD	
			131	per DWE	82	per SWE	
Supply Boat Cost	\$8,500	per day					
Days to fill and haul	9.62	per DWD	6.92 days per SWD				
Trucking Cost	\$355	per 2- box truck	Truck rate (\$65/hr x 300 mi r.t. @55mph) per 2-box truck load				
OBF Lost Drilling Fluid (w/ Cuttings) Costs	\$126	per bbl	\$79 per bbl; industry quote				
BASELINE ALASKA (COOK INLET) OPERATIONS							
UNIT COSTS (No longer applicable)			SWD				
Cuttings Box Purchase Cost	\$135			Operator quotes of \$125/box in 1995; ENR CCI ratio of 1998\$/1995\$ :			
Capacity of Disposal Boxes	8			bbl per box			
Cost of Disposal Boxes	540			Vendor quote of \$500/box in 1995; ENR CCI ratio of 1998\$/1995\$ =			
Supply Boat Cost	\$8,500			per day, vendors			
Days rental	NA						
Trucking Cost	\$1,994			Vendor quote, \$1,800 per 22-ton (8-box) truckload in 1995 * ENR CCI			
No. boxes per 22-ton truckload	8			(-8 boxes * 8 bbls/box * 704 lbs / bbl = 45,056 lbs)			
Drilling Fluid Cost (lost with cuttings)	\$158			per bbl; from GOM vendor; Geographic Multiplier from Ofshore DD =			
				2.0			

BAT{NSPS} OPTION 1, GULF OF MEXICO OPERATIONS					DWD	DWE	SWD	SWE
UNIT COSTS								
BAT Solids Control Equipment	\$2,400	per day, including all equipment, labor, and materials;						
Drilling days (DWD; DWE; SWD; SWE)	0.4				7.9	17.5	5.2	10.9
Cuttings dryer+FRU that reduces base fluid retention from 10.2% to 4.03%		proportion drilling time to total operational time (i.e., SCE rental time )						data from industry
Installation and Downtime Costs: Installation	\$32,500	Installation is avg. of range;						
: Downtime	\$24,000	downtime = \$6,000/hour (avg.) x 4 hrs; costs from Parker 1999						
Drilling Fluid Costs (lost with cuttings)	\$221	per bbl SBF; cost from vendor						
Monitoring Analyses								
Crude Contamination of Drilling Fluid @ \$50/test	\$50	Cost from vendor						
Retention of Base Fluids by Retort @ \$50/test	\$50	Retort measured once per discharge per 500 ft drilled; costs from vendor						
Footage Drilled with SBF (DWD; DWE; SWD; SWE)					6,500	8,500	7,500	10,000
BAT{NSPS} OPTION 1, CALIFORNIA OPERATIONS					DWD	DWE	SWD	SWE
UNIT COSTS								
BAT Solids Control Equipment	\$3,840	Includes equipment, labor, & materials; apply GOM costs *CA multiplier (1.6, from offshore DD)						
Drilling days (DWD; SWD)					7.9	17.5	5.2	10.9
Cuttings dryer + FRU that reduces base fluid retention from 0.00% to 10.20%		0.4 proportion drilling time to total operational time (i.e., SCE rental time )						data from industry
Installation and Downtime Costs: Installation	\$52,000	Installation is avg. of GOM cost range; plus geographic multiplier						
: Downtime	\$38,400	downtime = \$6,000/hour (avg. GOM cost: Parker, 1999 x 4 hrs; plus geographic multiplier						
Drilling Fluid Costs (lost with cuttings)	\$354	per bbl SBF; GOM cost plus geographic multiplier; cost from vendor						
Monitoring Analyses								
Crude Contamination of Drilling Fluid @ \$50/test	\$50	Cost from vendor						
Retention of Base Fluids by Retort @ \$50/test	\$50	Retort measured once per discharge per 500 ft drilled; costs from vendor						
Footage Drilled with SBF (DWD; SWD)					6,500		7,500	
BAT{NSPS} OPTION 1, ALASKA (COOK INLET) OPERATIONS							SWD	
UNIT COSTS (No longer applicable)								
BAT Solids Control Equipment	\$4,800	Includes equipment, labor, & materials; apply GOM costs *AK multiplier (2.0, from offshore DD)						
Drilling days ( SWD)							5.2	data from industry
Cuttings dryer + FRU that reduces base fluid retention from 0.00% to 10.20%		0.4 proportion drilling time to total operational time (i.e., SCE rental time )						
Installation and Downtime Costs: Installation	\$65,000	Installation is avg. of GOM cost range; plus geographic multiplier						
: Downtime	\$48,000	downtime = \$6,000/hour (avg. GOM cost: Parker, 1999 x 4 hrs; plus geographic multiplier						
Drilling Fluid Costs (lost with cuttings)	\$442	per bbl SBF; GOM cost plus geographic multiplier; cost from vendor						
Monitoring Analyses								
Crude Contamination of Drilling Fluid @ \$50/test	\$50	Cost from vendor						
Retention of Base Fluids by Retort @ \$50/test	\$50	Retort measured once per discharge per 500 ft drilled; costs from vendor						
Footage Drilled with SBF (SWD)							7,500	

**BAT(NSPS) OPTION 2, GULF OF MEXICO OPERATIONS**  
**UNIT COSTS**

		DWD	DWE	SWD	SWE	
BAT Solids Control Equipment	\$2,400	per day, including all equipment, labor, and materials;				
Drilling days (DWD; SWD;)		7.9	17.5	5.2	10.9	data from industry
Cuttings dryer + FRU that reduces base fluid retention from 0.00% to 10.20%		0.4 proportion drilling time to total operational time (i.e., SCE rental time )				
Installation and Downtime Costs: Installation	\$32,500	Installation is avg. of range;				
: Downtime	\$24,000	downtime = \$6,000/hour (avg.) x 4 hrs; costs from Parker 1999				
Zero Discharge of Fines via Hauling:		0.25	0.23	0.38	0.28	
Disposal Costs @ \$10.13/bbl	10.13	See Worksheet 10				
Handling Cost @ \$4.75/bbl	4.75	See Worksheet 10				
Container Rental @ \$25/box/day	\$25	Orentas 2000				
Number boxes		2	4	2	3	
Number days to fill and haul		9.90	22.79	7.31	14.18	
Drilling Fluid Costs (lost with cuttings)	\$221	per bbl SBF; cost from vendor				
Monitoring Analyses						
Crude Contamination of Drilling Fluid @ \$50/test	\$50	Cost from vendor				
Retention of Base Fluids by Retort @ \$50/test	\$50	Retort measured once per discharge per 500 ft drilled; costs from vendor				
Footage Drilled with SBF (DWD; DWE; SWD; SWE)		6,500	8,500	7,500	10,000	

**BAT(NSPS) OPTION 2, CALIFORNIA OPERATIONS**

		DWD	SWD	
BAT Solids Control Equipment	\$3,840	Includes equipment, labor, & materials; apply GOM costs *CA multiplier (1.6, from offshore DD)		
Drilling days (DWD; SWD)		7.9	5.2	data from industry
Cuttings dryer + FRU that reduces base fluid retention from 0.00% to 10.20%		0.4 proportion drilling time to total operational time (i.e., SCE rental time )		
Installation and Downtime Costs: Installation	\$52,000	Installation is avg. of GOM cost range; plus geographic multiplier		
: Downtime	\$38,400	downtime = \$6,000/hour (avg. GOM cost: Parker, 1999 x 4 hrs; plus geographic multiplier		
Zero Discharge of Fines via Hauling:				
Disposal Cost @ \$16.05/bbl	12.41	see w/s 10 Vendor quote: \$35.00 per ton and 704 lbs waste cuttings per bbl		
Handling Cost @ \$7.54/bbl	5.83	see w/s 10		
Container Rental @ \$40/box/day	\$40	Orentas 2000		
Trucking Cost @ \$354/50-bbl truckload	\$354	per 50-bbl truck load Truck rate (\$65/hr x 300 mi r.t. @55mph) per 2-box truck load		
Number boxes (DWD; SWD)		3	2	
Number days to fill and haul		9.62	6.92	
Drilling Fluid Costs (lost with cuttings)	\$354	per bbl SBF; GOM cost plus geographic multiplier; cost from vendor		
Monitoring Analyses				
Crude Contamination of Drilling Fluid @ \$50/test	\$50	Cost from vendor		
Retention of Base Fluids by Retort @ \$50/test	\$50	Retort measured once per discharge per 500 ft drilled; costs from vendor		
Footage Drilled with SBF (DWD; SWD)		6,500	7,500	

**BAT(NSPS) OPTION 2, ALASKA (COOK INLET) OPERATIONS**  
**UNIT COSTS (No longer applicable)**

		SWD	
BAT Solids Control Equipment	\$4,800	Includes equipment, labor, & materials; apply GOM costs *AK multiplier (2.0, from offshore DD)	
Drilling days ( SWD)		5.2	
Cuttings dryer + FRU that reduces base fluid retention from 0.00% to 10.20%		0.4 proportion drilling time to total operational time (i.e., SCE rental time )	
Installation and Downtime Costs: Installation	\$65,000	Installation is avg. of GOM cost range; plus geographic multiplier	
: Downtime	\$48,000	downtime = \$6,000/hour (avg. GOM cost: Parker, 1999 x 4 hrs; plus geographic multiplier	
Zero Discharge of Fines via Hauling:			
Disposal Cost	\$540		
8-bbl Cuttings Box Purchase Cost @ \$135/box	\$135		
Trucking Cost @ \$1,944 per 8-box truckload	\$1,994		
Number boxes	39		
Number days	NA		
Drilling Fluid Costs (lost with cuttings)	\$442	per bbl SBF; GOM cost plus geographic multiplier; cost from vendor	
Monitoring Analyses			
Crude Contamination of Drilling Fluid @ \$50/test	\$50	Cost from vendor	
Retention of Base Fluids by Retort @ \$50/test	\$50	Retort measured once per discharge per 500 ft drilled; costs from vendor	
Footage Drilled with SBF (SWD)		7,500	

**WORKSHEET B: Cost Analysis for OBF and SBF**

	Diesal Oil	Mineral Oil				
	a	b	c = a+b	d = 1/c	n	n * D
x	\$70.00	\$90.00				
1/x	0.0143	0.0111	0.0254	39.3701	2	\$78.74

x	IO	V Estr	LowVisc V Estr				
	a	b	c	d = a+b+c	e = 1/d	n	n * D
	\$160.00	\$250.00	\$300.00	0.0136	73.6196	3	\$220.86
1/x	0.0063	0.0040	0.0033				

Cost of WB-drilling fluid: \$45.00 /bbl

**WORKSHEET C: Well Count Projections, Baseline and all Options**

BASELINE							
Existing Sources							
	SBF/OBF/WBF	Region	DWD	DWE	SWD	SWE	
857	WBF	Gulf of Mexico	12	36	511	298	1,125
201	SBF	Gulf of Mexico	16	48	86	51	
67	OBF	Gulf of Mexico	0	0	42	25	
5	WBF	Offshore California	0	0	3	2	7
0	SBF	Offshore California	0	0	0	0	
2	OBF	Offshore California	0	0	1	1	
4	WBF	Cook Inlet, Alaska	0	0	3	1	6
0	SBF	Cook Inlet, Alaska	0	0	0	0	
2	OBF	Cook Inlet, Alaska	0	0	1	1	
							1,130

1,138

New Sources						
	SBF/OBF/WBF	Region	DWD	DWE	SWD	SWE
38	WBF	Gulf of Mexico	11	0	27	0
20	SBF	Gulf of Mexico	15	0	5	0
2	OBF	Gulf of Mexico	0	0	2	0
0	WBF	Offshore California	0	0	0	0
0	SBF	Offshore California	0	0	0	0
0	OBF	Offshore California	0	0	0	0
0	WBF	Cook Inlet, Alaska	0	0	0	0
0	SBF	Cook Inlet, Alaska	0	0	0	0
0	OBF	Cook Inlet, Alaska	0	0	0	0

Note: By definition "exploratory" wells are excluded from the "new sources" category 60

		BAT OPT 1 Existing Sources						
		SBF/OBF/WBF	Region	DWD	DWE	SWD	SWE	
803	WBF	Gulf of Mexico	11	34	479	279	1,107	
264	SBF	Gulf of Mexico	17	49	124	74		
40	OBF	Gulf of Mexico	0	0	25	15		
5	WBF	Offshore California	0	0	3	2	7	
0	SBF	Offshore California	0	0	0	0		
2	OBF	Offshore California	0	0	1	1		
4	WBF	Cook Inlet, Alaska	0	0	3	1	6	
1	SBF	Cook Inlet, Alaska	0	0	1	0		
1	OBF	Cook Inlet, Alaska	0	0	0	1		

1,120

		New Sources					1,120
		SBF/OBF/WBF	Region	DWD	DWE	SWD	SWE
35	WBF	Gulf of Mexico	10	0	25	0	60
24	SBF	Gulf of Mexico	16	0	8	0	
1	OBF	Gulf of Mexico	0	0	1	0	
0	WBF	Offshore California	0	0	0	0	0
0	SBF	Offshore California	0	0	0	0	
0	OBF	Offshore California	0	0	0	0	
0	WBF	Cook Inlet, Alaska	0	0	0	0	0
0	SBF	Cook Inlet, Alaska	0	0	0	0	
0	OBF	Cook Inlet, Alaska	0	0	0	0	

Note: By definition "exploratory" wells are excluded from the "new sources" category 60

BAT OPT 2							
Existing Sources							
	SBF/OBF/WBF	Region	DWD	DWE	SWD	SWE	
803	WBF	Gulf of Mexico	11	34	479	279	1,107
264	SBF	Gulf of Mexico	17	49	124	74	
40	OBF	Gulf of Mexico	0	0	25	15	
5	WBF	Offshore California	0	0	3	2	7
0	SBF	Offshore California	0	0	0	0	
2	OBF	Offshore California	0	0	1	1	
4	WBF	Cook Inlet, Alaska	0	0	3	1	6
1	SBF	Cook Inlet, Alaska	0	0	1	0	
1	OBF	Cook Inlet, Alaska	0	0	0	1	

1,120

New Sources							
	SBF/OBF/WBF	Region	DWD	DWE	SWD	SWE	
35	WBF	Gulf of Mexico	10	0	25	0	60
24	SBF	Gulf of Mexico	16	0	8	0	
1	OBF	Gulf of Mexico	0	0	1	0	
0	WBF	Offshore California	0	0	0	0	0
0	SBF	Offshore California	0	0	0	0	
0	OBF	Offshore California	0	0	0	0	
0	WBF	Cook Inlet, Alaska	0	0	0	0	0
0	SBF	Cook Inlet, Alaska	0	0	0	0	
0	OBF	Cook Inlet, Alaska	0	0	0	0	

Note: By definition "exploratory" wells are excluded from the "new sources" category 60

BAT OPT 3							
Existing Sources							
	SBF/OBF/WBF	Region	DWD	DWE	SWD	SWE	
877	WBF	Gulf of Mexico	17	51	511	298	877
11	SBF	Gulf of Mexico	3	8	0	0	1,125
237	OBF	Gulf of Mexico	8	25	128	76	
5	WBF	Offshore California	0	0	3	2	7
0	SBF	Offshore California	0	0	0	0	
2	OBF	Offshore California	0	0	1	1	
4	WBF	Cook Inlet, Alaska	0	0	3	1	6
0	SBF	Cook Inlet, Alaska	0	0	0	0	
2	OBF	Cook Inlet, Alaska	0	0	1	1	

1,138

	New Sources						
	SBF/OBF/WBF	Region	DWD	DWE	SWD	SWE	
42	WBF	Gulf of Mexico	15	0	27	0	60
3	SBF	Gulf of Mexico	3	0	0	0	
15	OBF	Gulf of Mexico	8	0	7	0	
0	WBF	Offshore California	0	0	0	0	0
0	SBF	Offshore California	0	0	0	0	
0	OBF	Offshore California	0	0	0	0	
0	WBF	Cook Inlet, Alaska	0	0	0	0	0
0	SBF	Cook Inlet, Alaska	0	0	0	0	
0	OBF	Cook Inlet, Alaska	0	0	0	0	

Note: By definition "exploratory" wells are excluded from the "new sources" category 60

# Worksheet No. 1

## Compliance Cost Estimates (\$1999): Baseline Current Practice (BPT)

### Existing Sources; Gulf of Mexico

Technologies:	Discharge SBF cuttings via primary, secondary shakers & FRU; fractional SBF retention (wt:wt) determined as 10.2% Zero discharge of OBF cuttings via haul & land-disposal or on-site grinding and injection		
Model Well Types:	Four types: Deep- and Shallow-water, Development and Exploratory		
Per-Well Waste Volumes:			
Deep-water Development:	1,387	bbls waste SBF/OBF-cuttings ( 0.2% crude contamination)	
	532	bbls SBF/OBF lost with cuttings	
Deep-water Exploratory:	3,085	bbls waste SBF/OBF-cuttings ( 0.2% crude contamination)	
	1,184	bbls SBF/OBF lost with cuttings	
Shallow-water Development:	917	bbls waste SBF/OBF-cuttings ( 0.2% crude contamination)	
	352	bbls SBF/OBF lost with cuttings	
Shallow-water Exploratory:	1,921	bbls waste SBF/OBF-cuttings ( 0.2% crude contamination)	
	737	bbls SBF/OBF lost with cuttings	

Cost Item	DWD	DWE	SWD	SWE	SWD	SWE	TOTAL
<b>SBF &amp; OBF Discharge Costs</b>							
Drilling Fluid Costs, Wells Currently Using SBF SBF: (SBF@ \$221/bbl )	\$117,572	\$261,664	\$77,792	\$162,877	---	---	
					---	---	
<b>OBF Cost/Well : Haul and Dispose</b>	---	---	---	---	\$110,715	\$236,406	
<b>OBF: Well: Grind and Inject</b>	---	---	---	---	\$83,448	\$174,853	
Baseline Cost (\$/well)	\$117,572	\$261,664	\$77,792	\$162,877	\$105,262	\$224,096	
Unit Cost (\$/bbl)	\$85	\$85	\$85	\$85	\$115	\$117	
No. wells	16	48	86	51	42	25	
No. Wells Discharge (OBF: haul)	16	48	86	51	34	20	
No. wells (OBF: inject)					8	5	
TOTAL ANNUAL (\$)							
<b>BASELINE GOM COST (\$)</b>	\$1,881,152	#####	\$6,690,112	\$8,306,727	\$4,431,901	\$5,602,395	<b>\$39,472,159</b>
<b>Subtotal for SBF Wells:</b>	<b>\$29,437,863</b>						
<b>Subtotal for OBF Wells:</b>					<b>\$10,034,296</b>		

### UNIT COSTS

SBF @	\$221	\$/bbl lost w/ cuttings
SedTox Monitoring Test	\$575	\$/test, once per well

### WBF Upper Bound (10.73%) Analysis for Zero Discharge Wells (fail tox/sheen)

	Deep-Water Using WBF		Shallow-Water Using WBF	
	Development	Exploratory	Development	Exploratory
WBF haul, \$/well	\$906,022	\$2,724,495	\$627,810	\$1,429,659
WBF inject, \$/well	\$543,102	\$1,235,566	\$387,454	\$768,992
No. WBF wells	12	36	511	298
% WBF fail sheen /tox (a)	10.73%	10.73%	10.73%	10.73%
No wells fail sheen/tox	1	4	55	32
No. haul	1	4	44	26
No. inject			11	6
No. discharge	11	32	456	266
\$ haul	\$906,022	\$10,897,980	\$27,623,640	\$37,171,134
\$ inject			\$4,261,994	\$4,613,951
<b>Total \$</b>	<b>\$906,022</b>	<b>\$10,897,980</b>	<b>\$31,885,634</b>	<b>\$41,785,085</b>

(a) Per ODD

**Worksheet No. 2**
**Compliance Cost Estimates (1999\$): Baseline Current Practice (BPT)  
Existing Sources; California (NOTE: Costs no longer applicable to SBF  
reg analysis since no conversions to SBF are projected)**

Technology:	Zero-Discharge via Haul and Land-Dispose		
Model Well Types:	Deep- and Shallow-water Development Wells		
Per-Well Waste Volumes:			
	Deep-water Devel:	1,387 bbls waste OBF-cuttings ( 0.2% crude contamination)	
		532 bbls OBF lost with cuttings	
	Deep-water Explor:	3,085 bbls waste OBF-cuttings ( 0.2% crude contamination)	
		1,184 bbls OBF lost with cuttings	
	Shallow-water Devel:	917 bbls waste OBF-cuttings ( 0.2% crude contamination)	
		352 bbls OBF lost with cuttings	
	Shallow-water Explor.:	1,921 bbls waste OBF-cuttings ( 0.2% crude contamination)	
		737 bbls OBF lost with cuttings	

Cost Item	SWD	SWE	TOTAL	
<b>OBF Haul &amp; Land Dispose</b>				
Disposal Cost (\$12.53/bbl)	\$11,490	\$24,070		
Handling Cost (\$5.89/bbl)	\$5,401	\$11,315		
Container Rental (\$40/box/day * "x" boxes* "y" days to fill & haul)	\$15,007	\$22,698		
Supply Boat Cost (\$8,500/day)	\$81,770	\$58,820		
Trucking Cost (\$354/truck load)	\$7,091	\$14,536		
Drilling Fluid Costs (OBF lost with cuttings @ \$79/bbl)	\$44,352	\$92,862		
<b>TOTAL OBF Cost / Model Well, Haul/Land Dispose</b>	<b>\$165,111</b>	<b>\$224,301</b>		
<b>Unit Cost (\$/bbl)</b>	<b>\$180</b>	<b>\$117</b>		
<b>No. Wells</b>	<b>0</b>	<b>0</b>		
<b>TOTAL CA OBF HAUL/LAND DISPOSAL COST (\$)</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	
<b>UNIT COSTS</b>				
Disposal Cost	\$12.53	per bbl		
Handling Cost	\$5.89	per bbl		
Container Rental	\$40	per box per day		
Boxes per well	39	82		
<b>Days to fill &amp; haul</b>	<b>9.62</b>	<b>6.92</b>		
Trucking Cost	\$355	- box truck load		
Supply Boat Cost	\$8,500	per day		
Days to fill & haul	9.62	6.92		
OBF Lost Drilling Fluid (w/ Cuttings) Costs	\$126	per bbl		
<b>OBF Grind &amp; Inject Disposal:</b>				
Onsite Injection System @ \$4280/day x rental days x CA geographic multiplier	\$89,024	\$186,608		
Drilling Fluid Costs	\$44,493	\$93,157		
<b>TOTAL CA OBF Cost per Model Well, Grind &amp; Inject (\$)</b>	<b>\$133,517</b>	<b>\$279,765</b>		
<b>Unit Cost (\$/bbl)</b>	<b>\$146</b>	<b>\$146</b>		
<b>No. Wells</b>	<b>1</b>	<b>1</b>		
<b>TOTAL CA OBF &amp; GRIND &amp; INJECT COST (\$)</b>	<b>\$133,517</b>	<b>\$279,765</b>	<b>\$413,282</b>	
<b>Unit Costs</b>				
<b>Drilling days</b>	<b>5.2</b>	<b>10.9</b>		
Drilling days :Operating Days	0.4	0.4		
<b>Rental Days</b>	<b>13.0</b>	<b>27.3</b>		
Geographic multiplier	1.6	1.6		
OBF Drilling Fluid	\$79.00	\$79.00		



**Worksheet No. 3****Compliance Cost Estimates (1999\$): Baseline Current Practice (BPT)****Existing Sources; Cook Inlet, Alaska**

Technology: Model Well Types:		Zero-Discharge via Haul and Land-Dispose Shallow-Water Development Wells		
Per-Well Waste Volumes:	<b>SWD</b>	<b>SWE</b>		
	917	1,921	bbls waste OBF-cuttings ( 0.2% crude contamination)	
	352	737	bbls OBF lost with cuttings	
<b>Cost Item</b>	<b>SWD</b>	<b>SWE</b>		
<b>OBF Onsite Injection Costs</b>			Drilling days, SWD: SWE:	
Onsite Injection System @ \$8560/day (drilling days = 40% of time on rig, thus rental days = 2.5 x drilling days)	\$111,280	\$233,260	5.2	10.9
			Drilling days: Days-to-Drill Fraction:	0.4
			Days-to-Drill:	
			13.0	27.3
Drilling Fluid Cost (OBF lost with cuttings @ \$158/bbl)	\$55,616	\$116,446	Injection unit cost from GOM vendor	\$4,280
			Geographic Multiplier, Offshore DD	2
			AK injection unit cost, \$/day)	\$8,560
			Cost OBF (\$/bbl), GOM ;	\$79.00
			Geographic Multiplier, Offshore DD	2
			AK OBF cost, \$/bbl)	\$158.00
<b>Total Cost per Model Well (\$)</b>	<b>\$166,896</b>	<b>\$349,706</b>		
<b>Unit Cost (\$/bbl)</b>	<b>\$182</b>	<b>\$381</b>		
<b>No. Wells</b>	<b>1</b>	<b>1</b>		
<b>Total OBF Costs per Well Type, Cook Inlet (\$)</b>	<b>\$166,896</b>	<b>\$349,706</b>	Per-well costs x 1 shallow-water development wells	
<b>Total Annual Baseline OBF Cook Inlet COST (\$)</b>		<b>\$516,602</b>		
<b>SBF Onsite Injection Costs</b>				
Onsite Injection System @ \$8560/day	\$111,280	\$233,260		
Drilling Fluid Cost (SBF lost with cuttings @ \$442/bbl)	\$155,584	\$325,754	Cost from GOM vendor; Geographic	221
			Multiplier from Offshore DD	2
				442
Total Cost per Well	\$266,864	\$559,014		

**Worksheet No. 4**
**Compliance Cost Estimates (1999\$): Cuttings Dryer & FRU Discharge (BAT/NSPS Option 1)**
**Existing Sources; Gulf of Mexico**

Technology:	Discharge via both an add-on drill cuttings "dryer" and a fines removal unit with an average fractional retention value for base fluid on cuttings (wt:wt) = 4.03%					
Model Well Types:	Four types: Deep- and Shallow-water, Development and Exploratory					
Per-Well Waste Volumes:						
Deep-water Development:	1,035	bbls waste cuttings (0.2% crude contamination)				
	180	bbls SBF/OBF lost with cuttings				
Deep-water Exploratory:	2,301	bbls waste cuttings (0.2% crude contamination)				
	400	bbls SBF/OBF lost with cuttings				
Shallow-water Development:	684	bbls waste cuttings (0.2% crude contamination)				
	119	bbls SBF/OBF lost with cuttings				
Shallow-water Exploratory:	1,433	bbls waste cuttings (0.2% crude contamination)				
	249	bbls SBF/OBF lost with cuttings				
Cost Item	DWD	DWE	SWD	SWE	TOTAL	
GOM Wells Projected to Use SBF (Current SBF plus 6%WBF & 40% OBF Wells Convert) and Discharging All Cuttings						
BAT Solids Control Equipment @ \$2400/day x rental days	\$47,400	\$105,000	\$31,200	\$65,400	\$249,000	Includes all equipment, labor, and materials; days of rental from industry
Cuttings dryer + fines removal unit						
Installation and Downtime Costs (\$32,500 inst + \$24,000 dt)	\$56,500	\$56,500	\$56,500	\$56,500	\$226,000	Installation costs (\$32,500) plus \$6,000/hour (avg; Parker, 1999) x 4 hrs
Drilling Fluid Costs (SBF lost with cuttings @ \$180/bbl)	\$39,780	\$88,400	\$26,299	\$55,029	\$209,508	Cost from vendor
Monitoring Analyses						
Crude Contamination of Drilling Fluid @ \$50/test	\$50	\$50	\$50	\$50	\$200	Cost from vendor
Retention of Base Fluids by Retort @ \$50/test	\$1,300	\$1,700	\$1,500	\$2,000	\$6,500	Retort run once/discharge/500 ft drilled;
SedTox Monitoring Test	\$575	\$575	\$575	\$575		one commingled discharge; cost from vendor
Unadjusted Cost Per Well (\$)	\$145,605	\$252,225	\$116,124	\$179,554		
Unit Cost (\$/bbl)	\$141	\$110	\$170	\$125		
No. SBF wells + WBF>SBF wells + OBF > SBF wells	17	49	124	74	264	
Total Annual GOM Cost for SBF Wells (\$)	\$2,475,285	\$12,359,025	\$14,399,376	\$13,286,996	\$42,520,682	
Installation/Downtime Well / Structure Adj't Factor	2.2	1.6	2.2	1.6		
Installation/Downtime Well per Structure	(\$523,909)	(\$1,038,188)	(\$3,821,455)	(\$1,567,875)	(\$6,951,426)	
Total Cost Adjustment						
Total Adj'd Annual GOM Cost, SBF Wells	\$1,951,376	\$11,320,838	\$10,577,921	\$11,719,121	\$35,569,256	
Avg Adjusted Total Cost per well type	\$114,787	\$231,038	\$85,306	\$158,367		
GOM Wells Retaining Use of OBF ( 0% Conversion)						
Cost/Well : Haul and Dispose			\$110,715	\$236,406		
Cost/Well: Grind and Inject			\$83,448	\$174,853		
Weighted (80:20, haul:inject)Average Cost Per Well (\$)			\$105,262	\$224,096	\$329,358	
Unit Cost (\$/bbl)			\$115	\$117		
No. Wells			25	15		
No. Wells haul			20	12		
No. Wells inject			5	3		
TOT ANNUAL GOM COST (OBF Wells; \$)			2,631,544	3,361,437	5,992,981	
TOT Annual GOM Cost for SBF Improved Solids Control (\$)					35,569,256	
TOT Annual GOM Cost , SBF+OBF Wells					41,562,237	
UNIT COSTS						
Drilling days (DWD; DWE; SWD; SWE)	7.90	17.50	5.20	10.90		
Proportion drilling time to operational (rental) time	0.40					
BAT Solids Control Equipment (cuttings dryer+FRU )	\$2,400 per day, including equipment, labor, and materials;					
Installation and Downtime Costs: Installation	\$32,500 Installation is avg. of range;					
: Downtime	\$24,000 downtime = \$6,000/hour (avg.) x 4 hrs; costs from Parker 1999					
Drilling Fluid Costs (lost with cuttings)	\$221 per bbl SBF; cost from vendor					
Monitoring Analyses						
Footage Drilled with SBF (DWD; DWE; SWD; SWE)	6,500	8,500	7,500	10,000		
Retention of Base Fluids by Retort @ \$50/test	50	50	50	50		Retort measured once per discharge per 500 ft drilled; costs from vendor
Crude Contamination of Drilling Fluid @ \$50/test	50	50	50	50		Cost from vendor
SedTox Monitoring Test	575	575	575	575		
* FRU: fines removal unit (i.e., decanting centrifuge or mud cleaner)						

**Worksheet No. 4-A**
**WBF Upper Bound (10.73%) Analysis for Zero Discharge Wells**
**Existing Sources; Gulf of Mexico**

(Costs incurred only if WBF wells are projected to fail their toxicity or sheen limits)

**BAT 1 & 2**

WBF ANALYSIS: (WBF > SBF Wells Only, projected WBF Costs)		DWD	DWE	SWD	SWE	
haul		\$906,022	\$2,724,495	\$627,810	\$1,429,659	(see worksheet 20 for per well cost detail)
inject		\$543,102	\$1,235,566	\$387,454	\$768,992	(see worksheet 20A for per well cost detail)
Total No. WBF>SBF Wells		1	2	32	19	
% Fail sheen/tox		10.73%	10.73%	10.73%	10.73%	
No. Wells Fail sheen/tox		0	0	3	2	
No. haul		0	0	2	2	
No. inject				1	0	
Cost to haul		\$0	\$0	\$1,255,620	\$2,859,318	\$4,114,938
Cost to inject		\$0	\$0	\$387,454	\$0	\$387,454
Total WBF> SBF Haul+Inject Costs		\$0	\$0	\$1,643,074	\$2,859,318	<b>\$4,502,392</b>

BAT 1 & 2 WBF ANALYSIS: (Remaining WBF Wells)		DWD	DWE	SWD	SWE	
WBF haul, \$/well		\$906,022	\$2,724,495	\$627,810	\$1,429,659	
WBF inject, \$/well		\$543,102	\$1,235,566	\$387,454	\$768,992	
No. WBF wells		11	34	479	279	
% WBF fail sheen /tox (a)		10.73%	10.73%	10.73%	10.73%	
No wells fail sheen/tox		1	4	51	30	
No. haul		1	4	41	24	
No. inject				10	6	
\$ haul		\$906,022	\$10,897,980	25,740,210	34,311,816	\$71,856,028
\$ inject				\$3,874,540	\$4,613,951	\$8,488,491
Total \$		\$906,022	\$10,897,980	\$29,614,750	\$38,925,767	<b>\$80,344,519</b>

(a) Per ODD

**\$84,846,911**
**Installation/Downtime Adjusted BAT 1 SBF Well Costs**

	DWD	DWE	SWD	SWE	Totals
Total Annual GOM Disposal Cost for SBF Wells (\$)	\$2,475,285	\$12,359,025	\$14,399,376	\$13,286,996	\$42,520,682
No. Wells	17	49	124	74	264
Average Cost per well type	\$145,605	\$252,225	\$116,124	\$179,554	\$161,063
Installation/Downtime Well/Structure Adjustment	(\$523,909)	(\$1,038,188)	(\$3,821,455)	(\$1,567,875)	(\$6,951,426)
TOTAL ADJ'D ANNUAL GOM Cost, SBF Wells (\$)	\$1,951,376	\$11,320,838	\$10,577,921	\$11,719,121	\$35,569,256
Average Adjusted Total Cost per well type	114,787	231,038	85,306	158,367	
GOM-wide wtd avg per well					\$134,732

**Existing Sources, California (Costs no longer applicable; 0% conversion to SBF projected)**

Technology:	Discharge via both an add-on drill cuttings "dryer" and a fines removal unit with an average fractional retention of base fluid on cuttings (weight:weight) = 4.03%
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Model Well Types:	Deep- and Shallow-Water Development Wells
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Per-Well Waste Volumes:			
	Shallow-water Explor.:	1,433	bbls waste SBF-cuttings (0.2% crude contamination)
		249	bbls SBF lost with cuttings
	Shallow-water Development:	684	bbls waste SBF-cuttings (0.2% crude contamination)
		119	bbls SBF lost with cuttings

A-28

**Worksheet No. 6**
**Compliance Cost Estimates (1999\$): Cuttings Dryer/FRU Discharge (BAT/NSPS Option 1)**
**Existing Sources; Cook Inlet, Alaska (NOTE: SBF disposal projected via onsite injection)**

Technology: Discharge via both an add-on drill cuttings "dryer" and fines removal unit; average fractional retention of basefluid on cuttings (wt:wt) = 4.03%

Model Well Types: Shallow-Water Development Wells

Per-Well Waste Volumes:

Shallow-water Development: 917 bbls waste SBF-cuttings (0.2% crude contamination)  
352 bbls SBF lost with cuttings [NOTE: volumes not the same  
Shallow-water Exploration: 1,921 as other BAT1 volumes -- current practice is to inject OBF;  
737 will not upgrade tmt system to reduce retention on cuttings. ]

Cost Item	SWD	SWE	
<b>AK WBF Wells: Grind &amp; Onsite Injection (if applicable)</b>			
Onsite Injection System @ \$8560/day (drilling days = 40% of time on rig, thus rental days = 2.5 x drilling days)	\$222,560	\$466,520	
Drilling Fluid Cost (WBF lost with cuttings @ \$90/bbl)	\$27,302	\$52,961	Cost from GOM vendor; Geographic Multiplier from Offshore DD \$180 2
<b>TOTAL Cost Per Well (\$)</b>	\$249,862	\$519,481	
<b>Unit Cost (\$/bbl)</b>	\$178	\$191	
<b>No. Wells Fail Limts</b>	0	0	
<b>Total Annual Cook Inlet Cost per Well Type (\$)</b>	\$0	\$0	
<b>TOTAL ANNUAL Cook Inlet Cost (\$)</b>			
<b>UNIT COSTS</b>			
BAT Solids Control Eqpt (cuttings dryer+fines removal unit)	\$4,800		Includes eqpt/labor/mat'l; geogr multiplier (1.6) from ODD from industry
<b>Drilling days (SWD)</b>	<b>5.2</b>	<b>10.9</b>	
Proportion drilling time to oper'l time (SCE rental time)	\$0		
Installation and Downtime Costs: Installation	\$65,000		Install'n is avg. of GOM cost range; + geogr multiplier dwntime =\$6K/h (avg. GOM cost; Parker, 1999x4 h; + geogr multiplier per bbl SBF; GOM cost + geogr multiplier; cost from vendor
: Downtime	\$48,000		
SBF Drilling Fluid Costs (lost with cuttings)	\$442		
Monitoring Analyses			
Crude Contamination of Drilling Fluid @ \$50/test	\$50		Cost from vendor
Retention of Base Fluids by Retort @ \$50/test	\$50		Retort once/discharge/500 ft; 2 discharges
Footage Drilled with SBF (SWD)	\$7,500		(cuttings dryer and FRU); costs from vendor
<b>AK Well (n=1) Projected to Convert from OBF to SBF; Onsite Injection</b>			
Cost Item	SWD	SWE	
Onsite Injection System @ \$8560/day (drilling days = 40% of time on rig, thus rental days = 2.5 x drilling days)	\$111,280	\$233,260	see Baseline worksheet for details
Drilling Fluid Cost (SBF lost with cuttings @ \$442/bbl)	\$155,584	\$325,754	Cost from GOM vendor; Geographic Multiplier from Offshore DD \$221 2
<b>Total Cost per Model Well (\$)</b>	<b>\$266,864</b>	<b>\$559,014</b>	
<b>Unit Cost (\$/bbl)</b>	<b>\$291</b>	<b>\$291</b>	
<b>No. Wells</b>	<b>1</b>	<b>0</b>	
<b>Total OBF Costs per Well Type, Cook Inlet (\$)</b>	<b>\$266,864</b>	<b>\$0</b>	
<b>Total Annual Baseline OBF Cook Inlet COST (\$)</b>	<b>\$266,864</b>		
<b>AK OBF Wells (n=2) Projected to Remain OBF; Onsite Injection</b>			
Onsite Injection System @ \$8560/day (drilling days = 40% of time on rig, thus rental days = 2.5 x drilling days)	\$111,280	\$233,260	Cost from GOM vendor; Geographic Multiplier from Offshore DD \$79 2
Drilling Fluid Cost (OBF lost with cuttings @ \$158/bbl)	\$55,616	\$116,446	
<b>Total Cost per Model Well (\$)</b>	<b>\$166,896</b>	<b>\$349,706</b>	
<b>Unit Cost (\$/bbl)</b>	<b>\$182</b>	<b>\$182</b>	
<b>No. Wells</b>	<b>0</b>	<b>1</b>	
<b>Total OBF Costs per Well Type, Cook Inlet (\$)</b>	<b>\$0</b>	<b>\$349,706</b>	
<b>Total Annual Baseline OBF Cook Inlet COST (\$)</b>		<b>\$349,706</b>	

**Worksheet No. 6-A BAT/NSPS Option 1, Alaska****WBF Upper Bound (10.73%) Analysis for Zero Discharge Wells****(Costs incurred only if WBF wells are projected to fail their toxicity or sheen limits)**

SWD	1,404 bbls waste cuttings
SWD	6,067 bbls WBF discharged
SWE	2,723 bbls waste cuttings
SWE	11,769 bbls WBF discharged

WBF Disposal	DWD	DWE	SWD	SWE
Onsite Injection System @\$8560/day	NA	NA	\$222,560	\$466,520
Drilling Fluid Cost			\$27,302	\$52,961
Total Cost / Model Well (\$)			\$249,862	\$519,481
Unit Cost (\$/bbl)			\$178	\$191
No Wells			3	1
No. Wells Fail Limits			0	0
Total Costs per Well Type,			\$0	\$0
Total Annual Baseline Cook Inlet Costs (\$)				<b>\$0</b>
% WBF wells projected to fail toxicity and/or /sheen limitations				10.73%
			5.00% adherent fluid	
			\$90 per bbl, WBF	

**Worksheet No. 7****Compliance Cost Estimates (1999\$): Cuttings Dryer Discharge; Zero Discharge FRUs (BAT/NSPS Option 2)****Existing Sources; Gulf of Mexico**

Technology:	Discharge via both an add-on drill cuttings "dryer" and a fines removal unit with an average fractional retention of base fluid on cuttings (weight:weight) = 3.82%				
Model Well Types:	Four types: Deep- and Shallow-water, Development and Exploratory				
Per-Well Waste Volumes (bbls):					
	DWD	DWE	SWD	SWE	
Waste Cuttings @ 3.82% Retention, bbl	999	2,221	660	1,383	
SBF Lost with Cuttings, bbl	166	368	109	229	
Waste Fines @ 10.2% Retention, bbl	36	80	24	50	
SBF Lost with Fines, bbl	14	32	9	21	
Cost Item	DWD	DWE	SWD	SWE	TOTAL
<b>GOM Wells Currently Using SBF and Discharging Cuttings</b>					
<b>DISCHARGED PORTION, SBF FLUIDS AND CUTTINGS DRYER WASTE STREAM</b>					
BAT Solids Control Equipment @ \$2400/day x rental days (Cuttings dryer + fines removal unit costs)	\$47,400	\$105,000	\$31,200	\$65,400	Includes all equipment, labor, and materials; days of rental from industry
Installation and Downtime Costs (\$32,500 inst + \$24,000 dt)	\$56,500	\$56,500	\$56,500	\$56,500	Installation is avg. of range; downtime is \$6,000/hour (avg.) x 4 hrs; costs from Parker 1999
Adjustment to Installation/Dopwntime Costs - Multiple Well Structures: Projected No. Wells per Structure	2.2	1.6	2.2	1.6	
Adjusted Cost per well for Installation and Downtime	(\$30,818)	(\$21,188)	(\$30,818)	(\$21,188)	
Drilling Fluid Costs @ \$221/bbl: SBF lost with cuttings	\$36,686	\$81,328	\$24,089	\$50,609	Cost from vendor
Monitoring Analyses					
Crude Contamination of Drilling Fluid @ \$50/test	\$50	\$50	\$50	\$50	Cost from vendor
Retention of Base Fluids by Retort @ \$50/test	\$650	\$850	\$750	\$1,000	Retort measured once per discharge per 500 ft drilled;
SedTox Monitoring Test	\$575	\$575	\$575	\$575	cost from vendor
<b>Costs per Well, Discharged Waste/Cuttings Dryer Portion</b>	\$111,043	\$223,116	\$82,346	\$152,947	
Unit Cost (\$/bbl)	\$111	\$100	\$125	\$111	
No. SBF wells + WBF>SBF wells + OBF > SBF wells	17	49	124	74	
<b>Annual GOM Cost for Cuttings Dryer Units/SBF Wells</b>	<b>\$1,887,728</b>	<b>\$10,932,660</b>	<b>\$10,210,881</b>	<b>\$11,318,041</b>	<b>\$34,349,310</b>
<b>DISCHARGED PORTION, ZERO DISCHARGE FINES REMOVAL WASTE STREAM</b>					
Zero Discharge of Fines via Hauling					
Disposal Costs @ \$10.13/bbl	\$365	\$810	\$243	\$507	
Handling Cost @ \$4.75/bbl	\$171	\$380	\$114	\$238	
Container Rental @ \$25/box/day x no. bxx x days to fill and haul	\$495	\$2,279	\$366	\$1,064	
Drilling Fluid Costs @\$221/bbl : SBF Lost with Fines	\$3,094	\$7,072	\$1,989	\$4,641	
<b>Costs per Well, Zero Discharge FRU Portion</b>	<b>\$4,125</b>	<b>\$10,541</b>	<b>\$2,712</b>	<b>\$6,449</b>	
Unit Cost (\$/bbl)	\$115	\$132	\$113	\$129	
No. SBF wells + WBF>SBF wells + OBF > SBF wells	17	49	124	74	
<b>Annual GOM Cost for Fines Removal Units/SBF Wells</b>	<b>\$70,119.56</b>	<b>\$516,528.60</b>	<b>\$336,240.88</b>	<b>\$477,189.00</b>	<b>\$1,400,078.04</b>
<b>TOTAL GOM SBF BAT 3 COSTS PER WELL</b>	<b>\$115,167.50</b>	<b>\$233,656.90</b>	<b>\$85,057.44</b>	<b>\$159,395.00</b>	
<b>TOTAL GOM SBF BAT 3 COSTS</b>	<b>\$1,957,847.56</b>	<b>\$11,449,188.60</b>	<b>\$10,547,121.88</b>	<b>\$11,795,230.00</b>	<b>\$35,749,388.04</b>

GOM Wells Currently Using OBF ( 0% Conversion)						
Cost/Well : Haul and Dispose			\$110,715	\$236,406		
Cost/Well: Grind and Inject			\$83,448	\$174,853		
Weighted (80:20, haul:inject)Average Cost Per Well (\$)			\$105,262	\$224,096		
Unit Weighted Average Cost (\$/bbl)			\$115	\$117		
No. Wells			25	15	40	
TOTAL ANNUAL GOM Cost for OBF Wells (\$)			\$2,631,544	\$3,361,437	\$5,992,981	
TOTAL ANNUAL GOM Cost for SBF Improved Solids Control (\$)					\$35,749,388	
TOTAL ANNUAL GOM Cost , SBF+OBF Wells					\$41,742,369	
UNIT COSTS						
BAT Solids Control Equipment (cuttings dryer + fines removal unit)	\$2,400 per day, including all equipment, labor, and materials;					
Drilling days (DWD; DWE; SWD; SWE)	7.90	17.50	5.20	10.90	data from industry	
Proportion of drilling time to total operational time (I.e., SCE rental time)	0.4					
Installation and Downtime Costs: Installation	\$32,500 Installation is avg. of range;					
: Downtime	\$24,000 downtime = \$6,000/hour (avg.) x 4 hrs; costs from Parker 1999					
Zero Discharge of Fines via Hauling:						
Disposal Costs @ \$10.13/bbl	\$10.13	See Worksheet 10				
Handling Cost @ \$4.75/bbl	\$4.75	See Worksheet 10				
Container Rental @ \$25/box/day	\$25	Orentas 2000				
Number boxes	2	4	2	3		
Number days to fill and haul	9.90	22.79	7.31	14.18		
Drilling Fluid Costs (lost with cuttings)	\$221 per bbl SBF; cost from vendor					
Monitoring Analyses						
Crude Contamination of Drilling Fluid @ \$50/test	\$50 Cost from vendor					
Retention of Base Fluids by Retort @ \$50/test	\$50 Retort measured once per discharge per 500 ft drilled; one disharge point (cuttings dryer) costs from vendor					
Footage Drilled with SBF (DWD; DWE; SWD; SWE)	6500	8500	7500	10000		
SedTox Monitoring Test	\$575					
Haul/Inject Disposal Costs for SBF Fines Only						
	Deep Water Devel. Well	Deep Water Explor. Well	Shallow Water Devel. Well	Shallow Water Explor. Well		
Disposal Costs @ \$10.13/bbl	\$365	\$810	\$243	\$507		
Handling Cost @ \$4.75/bbl	\$171	\$380	\$114	\$238		
Container Rental @ \$25/bx/d	\$495	\$2,279	\$366	\$1,064		
SBF lost with fines	\$3,094	\$7,072	\$1,989	\$4,641		
Total Cost Per Well (\$)	\$4,125	\$10,541	\$2,712	\$6,449		
No. Wells	17	49	124	74		
TOTAL GOM DISPOSAL COSTS	\$70,120	\$516,529	\$336,241	\$477,189	\$1,400,078	



**Worksheet No. 8**

(see Baseline CA sheet (W/Ss 2 &amp; 2-A) for SBF/OBF cost projections, all options)

**Compliance Cost Estimates (1999\$): Cuttings Dryer Discharge;**
**Zero Discharge FRUs (BAT/NSPS Option 2)**
**Existing Sources, California (Costs no longer applicable; 0% conversion to SBF projected)**

Technology:	Discharge via both an add-on drill cuttings "dryer" retention of base fluid on cuttings (wt:wt) = 3.82%			
Model Well Types:	Deep- and Shallow-Water Development Wells			
Per-Well Waste Volumes:				
	SWE	SWD		
Waste Cuttings @ 3.48% Retention	1,383	660		
SBF Lost with Cuttings	229	109		
Waste Fines @ 9.42% Retention	50	24		
SBF Lost with Fines	20	9		
Cost Item	SWE	SWD	TOTAL	
SBF Discharge/Disposal				
BAT Solids Control Equipment @ \$3840/day x rental days Cuttings dryer + fines removal unit	\$75,840	\$49,920		Includes all equipment, labor, and materials; Geographic Area Cost Multiplier (1.6) from Offshore DD; rental days from industry
Installation and Downtime Costs (\$52,000 inst + \$38,400 dt)	\$90,400	\$90,400		Installation is avg. of range; downtime is \$6,000/hour (avg) x 1.6 (area multiplier) x 4 hours; costs from Parker 1999
Zero Discharge of Fines via Hauling				
Disposal Cost @ \$12.41/bbl	\$0	\$0		
Handling Cost @ \$5.83/bbl	\$0	\$0		
Container Rental @ \$40/box/day	\$1,154	\$554		
Trucking Cost @ \$354/50-bbl truckload	\$354	\$354		
Drilling Fluid Costs @ \$354/bbl				Cost from vendor; Geographic Multiplier from Offshore DD
SBF lost with cuttings	\$81,066	\$38,586		
SBF lost with fines	\$7,080	\$3,186		
Monitoring Analyses				
Crude Contamination of Drilling Fluid @ \$50/test	\$50	\$50		Cost from vendor
Retention of Base Fluids by Retort @ \$50/test	\$650	\$750		Retort measured once per discharge per 500 ft drilled;
SedTox Monitoring Test	\$575	\$0		cost from vendor
TOTAL Cost Per Well (\$)	\$256,815	\$183,446		
Unit Cost (\$/bbl)	\$179	\$268		
No. Wells	0	0		
TOTAL ANNUAL CA Cost (\$)	\$0	\$0	\$0	Per-well costs x no. of wells
UNIT COSTS				
Drilling days (DWD; SWD)	7.9	5.2	data from industry	
fraction of drilling time to total operational (i.e., rental) time	0.4			
BAT Solids Control Equipment (cuttings dryer + FRU)	\$3,840		Includes all equipment, labor, and materials; geographic multiplier (1.6) from offshore DD	
Installation and Downtime Costs: Installation	\$52,000		Installation is avg. of GOM cost range; plus geographic multiplier	
: Downtime	\$38,400		downtime = \$6,000/hour (avg. GOM cost; Parker, 1999) x 4 hrs; plus geographic multiplier	
Zero Discharge of Fines via Hauling:			per bbl SBF; GOM cost plus geographic multiplier; cost from vendor	
Disposal Cost @ \$12.32/bbl	\$0			
Handling Cost @ \$5.79/bbl	\$0			
Container Rental @ \$40/box/day	\$40			
Trucking Cost @ \$354/50-bbl truckload	\$354		per 50-bbl truck load	
Number boxes	3	2		
Number days to fill and haul	9.62	6.92		
Drilling Fluid Costs (lost with cuttings)	354			
Monitoring Analyses				
Footage Drilled with SBF (DWD; SWD)	6,500	7,500		
Retention of Base Fluids by Retort @ \$50/test	\$50		Retort once/discharge/500 ft drilled; 1 discharge point (cuttings dryer) costs from vendor	
Crude Contamination of Drilling Fluid @ \$50/test	\$50		Cost from vendor	
SedTox Monitoring Test	\$575			

**Worksheet No. 9**
**Compliance Cost Estimates (1999\$): Discharge from Cuttings Dryer; Zero Discharge of Fines (BAT 2) Existing Sources; Cook Inlet, Alaska (NOTE: projected SBF disposal -- onsite injection)**

Technology:		Discharge via add-on drill cuttings "dryer" and fines removal unit; average fractional retention of base fluid on cuttings (wt:wt) = 3.82%		
Model Well Types:		Shallow-Water Development Wells		
Per-Well Waste Volumes:		bbls SBF lost with cuttings [NOTE: the volumes are not the same as other BAT1 volumes because current practice is to inject OBF; will not upgrade trmt system to reduce retention on cuttings. ]		
	SWD			SWE
Waste Cuttings @ 3.48% Retention	917			1,921
SBF Lost with Cuttings	352			737
Waste Fines @ 9.42% Retention	NA			NA
SBF Lost with Fines	NA	NA		
Cost Item	SWD	SWE		
AK WBF Wells: Grind and Onsite Injection Costs (if applicable)				
Onsite Injection System @ \$8560/day	NA	NA		
Drilling Fluid Cost, WBF	NA	NA		
TOTAL Cost Per Well (\$)	\$0	\$0		
Unit Cost (\$/bbl)	\$0	\$0		
No. Wells Fail Limits	0	0		
TOTAL ANNUAL Cook Inlet Cost (\$)	\$0	\$0		
0				
UNIT COSTS				
Drilling days	5.2	10.9		
Proportion of drilling time to total operational (I.e., rental) time	0.4			
SBF Drilling Fluid Cost/bbl (lost with cuttings)	\$442	\$442		
AK Well (n=1) Projected to Convert from OBF to SBF; Onsite Injection				
Cost Item	SWD	SWE	see Baseline worksheet for details	
Onsite Injection System @ \$8560/day (drilling days = 40% of time on rig, thus rental days = 2.5 x drilling days)	\$111,280	\$233,260		
Drilling Fluid Cost (SBF lost with cuttings @ \$442/bbl)	\$155,584	\$325,754		
Total Cost per Model Well (\$)	\$266,864	\$559,014		
Unit Cost (\$/bbl)	\$291	\$291		
No. Wells	1	0		
Total Annual Baseline OBF Cook Inlet COST (\$)	266,864.00			
AK OBF Well Projected to Remain OBF; Onsite Injection				
Total Cost per Model Well (\$)	\$166,896	\$349,706		
Unit Cost (\$/bbl)	\$182	\$182		
No. Wells	0	1		
Total Annual Baseline OBF Cook Inlet COST (\$)		\$349,706		

**Worksheet No. 9-A BAT/NSPS Option 2, Alaska****WBF Upper Bound (10.73% Analysis for Zero Discharge Wells****(Costs incurred only if WBF wells are projected to fail their toxicity or sheen limits)****WBF Disposal Analysis**

WBF Waste Volumes (per ODD Data)

SWD	1,404 bbls waste cuttings
SWD	6,067 bbls WBF discharged
SWE	2,723 bbls waste cuttings
SWE	11,769 bbls WBF discharged

	DWD	DWE	SWD	SWE
Onsite Injection System @\$8560/day	NA	NA	\$222,560	\$466,520
Drilling Fluid Cost			\$27,302	\$52,961
Total Cost / Model Well (\$)			\$249,862	\$519,481
Unit Cost (\$/bbl)			\$178	\$191
No. Wells			3	1
No. Wells Fail Limts			0	0
Total Costs / Well Type			\$0	\$0
Total Annual Cost				<b>\$0</b>
% WBF wells projected to fail toxicity and/or /sheen limitations				10.73%
5.00% adherent fluid				
\$90 per bbl, WBF				

# Worksheet No. 10

## Per Well Compliance Cost Estimates (1999\$): Zero Discharge (BAT 3)

### Existing Sources; Gulf of Mexico

Technology:		Zero-Discharge via Haul and Land-Dispose			
Model Well Types:		Four types: Deep- and Shallow-water, Development and Exploratory			
Per-Well Waste Volumes:					
Deep-water Development:		1,387	bbls waste cuttings (0.2% crude contamination)		
		532	bbls SBF lost with cuttings		
Deep-water Exploratory:		3,085	bbls waste cuttings (0.2% crude contamination)		
		1,184	bbls SBF lost with cuttings		
Shallow-water Development:		917	bbls waste cuttings (0.2% crude contamination)		
		352	bbls OBF lost with cuttings		
Shallow-water Exploratory:		1,921	bbls waste cuttings (0.2% crude contamination)		
		737	bbls OBF lost with cuttings		
Cost Item	DWD	DWE	SWD	SWE	
GOM OBF Wells Projected to Convert from SBF to OBF Under Zero Discharge					
Disposal Cost (\$10.13/bbl)	\$14,050	\$31,251	\$9,289	\$19,460	Average of \$9.50 and \$10.75, quoted from vendors Vendor quote, includes crains, labor, trucks to landfill, etc. Vendor
Handling Cost (\$4.75/bbl)	\$6,588	\$14,654	\$4,356	\$9,125	
Container Rental (\$25/box/day * "x" boxes* "y" days to fill & haul)	\$14,603	\$74,637	\$7,127	\$29,069	
Supply Boat Cost (\$8,500/day) x days to fill and haul	\$84,150	\$193,715	\$62,135	\$120,530	Vendors
Drilling Fluid Costs (OBF lost with cuttings @ \$79/bbl)	\$42,028	\$93,536	\$27,808	\$58,223	Vendor quote
TOTAL Cost per Model Well (\$)	\$161,419	\$407,793	\$110,715	\$236,406	
Unit Cost to Haul and Dispose (\$/bbl)	\$116	\$132	\$121	\$123	
GOM SBF Wells Projected to Remain as SBF Wells Under Zero Discharge					
Disposal Cost (\$10.13/bbl)	\$14,050	\$31,251	\$9,289	\$19,460	Average of \$9.50 and \$10.75, quoted from vendors Vendor quote, includes crains, labor, trucks to landfill, etc. Vendor
Handling Cost (\$4.75/bbl)	\$6,588	\$14,654	\$4,356	\$9,125	
Container Rental (\$25/box/day * "x" boxes* "y" days to fill & haul)	\$14,603	\$74,637	\$7,127	\$29,069	
Supply Boat Cost (\$8,500/day) x days to fill and haul	\$84,150	\$193,715	\$62,135	\$120,530	Vendors
Drilling Fluid Costs (SBF lost with cuttings @ \$221/bbl)	\$117,572	\$261,664	\$77,792	\$162,877	Vendor and operator quotes
TOTAL Cost per Model Well (\$)	\$236,963	\$575,921	\$160,699	\$341,060	
Unit Cost to Haul and Dispose (\$/bbl)	\$171	\$187	\$175	\$178	
For SBF > OBF Wells Under Zero Discharge					
Drilling Fluid Costs (OBF lost with cuttings @ \$79/bbl)					
Other Unchanged Costs	\$42,028	\$93,536			
	\$119,391	\$314,257			
TOTAL Cost per Model Well (\$)	\$161,419	\$407,793			
Unit Cost to Haul and Dispose (\$/bbl)	\$116	\$132			

## Worksheet No. 11

### Per Well Compliance Cost Estimates (1999\$): Zero Discharge (BAT 3)

#### Existing Sources; Gulf of Mexico

Technology:	Zero-Discharge via On-site Grinding and Injection				
Model Well Types:	Four types: Deep- and Shallow-water, Development and Exploratory				
Per-Well Waste Volumes:					
Deep-water Development:	1,387	bbls waste SBF-cuttings (0.2% crude contamination)			
	532	bbls SBF lost with cuttings			
Deep-water Exploratory:	3,085	bbls waste SBF-cuttings (0.2% crude contamination)			
	1,184	bbls SBF lost with cuttings			
Shallow-water Development:	917	bbls waste SBF-cuttings (0.2% crude contamination)			
	352	bbls OBF lost with cuttings			
Shallow-water Exploratory:	1,921	bbls waste SBF-cuttings (0.2% crude contamination)			
	737	bbls OBF lost with cuttings			
Cost Item	DWD	DWE	SWD	SWE	
<b>GOM OBF Wells Projected to Convert from SBF to OBF Under Zero Discharge</b>					
Onsite Injection System @ \$4280/day (drilling days = 40% of time on rig, thus rental days = 2.5 x drilling days)	---	---	\$55,640	\$116,630	Includes all equipment, labor, and services; vacuum system used to transport cuttings
Drilling Fluid Costs (OBF lost with cuttings @ \$79/bbl)	---	---	\$27,808	\$58,223	
<b>TOTAL Cost per Model Well (\$)</b>	---	---	<b>\$83,448</b>	<b>\$174,853</b>	
<b>Unit Cost to Grind and Inject (\$/bbl)</b>	---	---	\$91	\$91	
<b>GOM SBF Wells Projected to Remain as SBF Wells Under Zero Discharge</b>					
Onsite Injection System @ \$4280/day (drilling days = 40% of time on rig, thus rental days = 2.5 x drilling days)	\$84,530	\$187,250	---	---	Includes all equipment, labor, and services; vacuum system used to transport cuttings
Drilling Fluid Costs (SBF lost with cuttings @ \$221/bbl)	\$117,572	\$261,664	---	---	
<b>TOTAL Cost per Model Well (\$)</b>	<b>\$202,102</b>	<b>\$448,914</b>	---	---	Drilling Fluid Costs (OBF lost with cuttings @ \$79/bbl)
<b>Unit Cost to Grind and Inject (\$/bbl)</b>	\$146	\$146	---	---	

Worksheet No. 12  
Zero Discharge (BAT 3) Compliance Cost Estimates (1999\$)  
Existing Sources; Gulf of Mexico

Technology:	100% Deep- and 80% Shallow-water Wells Haul & Land-Dispose; 20% Shallow-water Wells Inject				
Model Well Types:	Four types: Deep- and Shallow-water, Development and Exploratory				
Per-Well Waste Volumes:					
Deep-water Development:	1,387	bbls waste SBF-cuttings (0.2% crude contamination)			
	532	bbls SBF lost with cuttings			
Deep-water Exploratory:	3,085	bbls waste SBF-cuttings (0.2% crude contamination)			
	1,184	bbls SBF lost with cuttings			
Shallow-water Development:	917	bbls waste SBF-cuttings (0.2% crude contamination)			
	352	bbls OBF lost with cuttings			
Shallow-water Exploratory:	1,921	bbls waste SBF-cuttings (0.2% crude contamination)			
	737	bbls OBF lost with cuttings			

Cost Item	DWD	DWE	SWD	SWE	TOTAL
<b>GOM OBF Wells Projected to Convert from SBF to OBF Under Zero Discharge</b>					
Unit Cost to Haul and Dispose (\$/well)	\$161,419	\$407,793	\$110,715	\$236,406	
Unit Cost to Grind and Inject (\$/well)	---	---	\$83,448	\$174,853	
<b>Per Well Cost for Zero Discharge (\$/well)</b>	---	---	\$105,262	\$224,096	
<b>No. Wells</b>	8	25	86	51	170
<b>SUBTOTAL ANNUAL GOM ZD COST (\$)</b>	\$1,291,352	\$10,194,826	\$31,910,282	\$11,428,885	<b>\$54,825,346</b>
<b>GOM SBF Wells Projected to Remain as SBF Wells Under Zero Discharge</b>					
Unit Cost to Haul and Dispose (\$/well)	\$236,963	\$575,921	---	---	
Unit Cost to Grind and Inject (\$/well)	---	---	---	---	
<b>Per Well Cost for Zero Discharge (\$/well)</b>	\$236,963	\$575,921	---	---	
<b>No. Wells</b>	3	8	0	0	
<b>SUBTOTAL ANNUAL GOM ZD COST (\$)</b>	\$710,889	\$4,607,368	---	---	<b>\$5,318,258</b>
<b>Total Annual GOM Costs for Zero Discharge (\$)</b>	<b>\$60,143,603</b>				

<b>GOM OBF Wells Projected to Continue as OBF Wells</b>					
Unit Cost to Haul and Dispose (\$/well)			\$110,715	\$236,406	
Unit Cost to Grind and Inject (\$/well)			\$83,448	\$174,853	
Weighted Average Unit Disposal Cost (\$/well)			\$105,262	\$224,096	
Number of Wells			34	20	54
Total Cost per Well Type			\$3,578,900	\$4,481,916	
<b>Total Cost</b>					<b>\$8,060,816</b>
<b>Total Annual GOM Costs for Zero Discharge (\$)</b>					<b>68,204,419</b>

<b>GOM Wells Using SBF Assumed to Switch to WBF Under Zero Discharge and Fail WBF Sheen/Tox Limits</b>					
<b>Per Well Cost for Zero Discharge (\$/well)</b>	\$161,419	\$407,793	\$105,262	\$224,096	
<b>No. Wells</b>	1	2	0	0	
<b>SUBTOTAL ANNUAL GOM ZD COST (\$)</b>	<b>\$161,419</b>	<b>\$815,586</b>	<b>\$0</b>	<b>\$0</b>	<b>\$977,005</b>

**WBF Disposal Analysis: Remaining WBF  
Wells + 49 SBF > WBF Discharging Wells)**

	DWD	DWE	SWD	SWE	TOTAL
Unit Cost to Haul and Dispose (\$/well)	\$906,022	\$2,724,495	\$627,810	\$1,429,659	
Unit Cost to Grind and Inject (\$/well)	\$543,102	\$1,235,566	\$387,454	\$768,992	
No. Wells, Total	16	49	511	298	
Projected % Wells to Fail Sheen/Tox Limitations	10.73%	10.73%	10.73%	10.73%	
Projected No. Wells to Fail Sheen/Tox Limitations	2	5	55	32	94
No. Wells Projected to Haul & Land Dispose	2	5	44	26	
80%					
No. Wells Projected to Grind & Inject Onsite	0	0	11	6	
20%					
<b>Total Cost to Haul &amp; Land Dispose</b>	<b>\$1,812,044</b>	<b>\$13,622,475</b>	<b>\$27,623,640</b>	<b>\$37,171,134</b>	<b>\$80,229,293</b>
<b>Total Cost to Grind &amp; Inject</b>	<b>\$0</b>	<b>\$0</b>	<b>\$4,261,994</b>	<b>\$4,613,951</b>	<b>\$8,875,945</b>
<b>Total Cost of Disposal, WBF Wells</b>	<b>\$1,812,044</b>	<b>\$13,622,475</b>	<b>\$31,885,634</b>	<b>\$41,785,085</b>	<b>\$89,105,238</b>

**Total GOM Cost of Disposal, \$158,286,662**

Summary Compliance Costs for Management of Large Volume SBF Wastes, Existing Sources ('40% OBF Wells, 6% WBF Wells Convert'), 1999\$ Lower (0%) WBF Failure Rate Boundary							
Baseline Costs: Total Annual							
	Baseline Technology(a)	GOM	CA	AK(CI)	Total Per Technology	NOTES	
	Discharge with 10.2% retention of base fluid on cuttings from SBF wells	29,437,863	0	0	29,437,863	Worksheet No. 1	
	Zero Discharge--current OBF users	10,034,296	413,282	516,602	10,964,179	Worksheet No.s 1, 2, and 3	
	Zero Discharge--current WBF users	0	0	0	0		
TOTAL Per Region		39,472,159	413,282	516,602	40,402,042		
Compliance Costs: Total Annual							
	Technology Option(b)	GOM	CA	AK(CI)	Total Per Technol	NOTES	
BAT-1	Discharges from Cuttings Dryer and FRUs (ROC = 4.03%); SBF wells	35,569,256	0	266,864	35,836,120	Worksheet No.s 4, 5, and 6	
	Discharges from Cuttings Dryer and FRUs (ROC = 4.03%); OBF wells	5,992,981	413,282	349,706	6,755,969		
	Discharges from Cuttings Dryer and FRUs (ROC = 4.03%); WBF wells	0	0	0	0		
	TOTAL Per Region		41,562,237	413,282	616,570		42,592,088
BAT-2	Discharges from Cuttings Dryer only (ROC = 3.82%); Zero Discharge FRUs; SBF wells	35,749,388	0	266,864	36,016,252	Worksheet No.s 7, 8, and 9	
	Discharges from Cuttings Dryer only (ROC = 3.82%); Zero Discharge FRUs; OBF wells	5,992,981	413,282	349,706	6,755,969		
	Discharges from Cuttings Dryer only (ROC = 3.82%); Zero Discharge FRUs; WBF wells	0	0	0	0		
	TOTAL Per Region		41,742,369	413,282	616,570		42,772,221
BAT-3	Zero Discharge: SBF wells	5,318,258	0	0	5,318,258	Worksheet No.s 10, 11, and 12	
	Zero Discharge: OBF wells	62,886,162	413,282	516,602	63,816,045		
	Zero Discharge: WBF wells	0	0	0	0		
	TOTAL Per Region		68,204,419	413,282	516,602		69,134,303
Incremental Compliance Costs: Total Annual							
	Technology Option	GOM	CA	AK(CI)	Total Per Technol	NOTES	
	BAT-1: Discharge from Cuttings Dryer and Fines Removal Unit	2,090,078	0	99,968	2,190,046	BAT-1 compliance cost :: total baseline cost differential	
	BAT-2: Discharge from Cuttings Dryer and Zero Discharge of Fines	2,270,210	0	99,968	2,370,178	BAT-2 compliance cost :: total baseline cost differential	
	Zero Discharge	28,732,260	0	0	28,732,260	BAT-3 (ZD) compliance cost :: GOM baseline cost differential	
WBF-related Costs (Savings)							
	Technology Option	GOM	CA	AK(CI)	Total Per Technol	NOTES	
	BAT-1: ROP-related rig cost savings	(33,280,000)	0	0	(48,832,540)		
	Discharged WBF cost savings	(15,552,540)	0	0			
	Zero discharge cost savings	0	0	0			
	BAT-2: ROP-related rig cost savings	(33,280,000)	0	0	(48,832,540)		
	Discharged WBF cost savings	(15,552,540)	0	0			
	Zero discharge cost savings	0	0	0			
NET Incremental Compliance Costs: Total Annual							
	Technology Option	GOM	CA	AK(CI)	Total Per Technol	NOTES	
	BAT-1: Discharge from Cuttings Dryer and Fines Removal Unit	(46,742,462)	0	99,968	(46,642,494)	BAT-1 compliance cost :: total baseline cost differential	
	BAT-2: Discharge from Cuttings Dryer and Zero Discharge of Fines	(46,562,330)	0	99,968	(46,462,362)	BAT-2 compliance cost :: total baseline cost differential	
	Zero Discharge**	28,732,260	0	0	28,732,260	BAT-3 (ZD) compliance cost :: total baseline cost differential	

(a) GOM: 857 WBF, 201 SBF wells, 67 OBF wells; CA: 5 WBF, 2 OBF wells; AK 4 WBF, 2 OBF wells

(b) BAT 1: GOM: 803 WBF, 264 SBF wells, 40 OBF wells; CA: 5 WBF, 2 OBF wells; AK 4 WBF, 1 SBF, 1 OBF wells

BAT 2: GOM: 803 WBF, 264 SBF wells, 40 OBF wells; CA: 5 WBF, 2 OBF wells; AK 4 WBF, 1 SBF, 1 OBF wells

BAT 3: GOM: 877 WBF, 11 SBF wells, 237 OBF wells; CA: 5 WBF, 2 OBF wells; AK 4 WBF, 2 OBF wells

**Worksheet No. 13**  
**Compliance Cost Estimates (1999\$): Baseline Current Practice (BPT)**  
**New Sources; Gulf of Mexico**

Technologies:		Discharge of SBF cuttings, add-on cuttings dryer, avg. ret'n= 10.2% (wt) base fluid on cuttings			
Model Well Types:		Deep- and Shallow-water Development			
Per-Well Waste Volumes:					
Deep-water Development:		1,387	bbls waste SBF cuttings (0.2% crude contamination)		
		532	bbls SBF lost with cuttings		
Shallow-water Development:		917	bbls waste SBF cuttings (0.2% crude contamination)		
		352	bbls SBF lost with cuttings		
Cost Item		DWD	DWE	TOTAL	
Drilling Fluid Costs for Wells Currently Using SBF					
(SBF@ \$221/bbl lost w/ cuttings)		\$117,572	\$77,792		Cost from vendor
Per Well Baseline Cost (\$/well)		\$117,572	\$77,792		Average cost for full analysis
Unit Cost (\$/bbl)		\$85	\$85		
No. Wells		15	5		
TOTAL ANNUAL BASELINE GOM SBF COST (\$)		\$1,763,580	\$388,960	\$2,152,540	Per-well costs x no. of wells
Drilling Fluid Costs for Wells Currently Using OBF					
(OBF@ \$79/bbl lost w/ cuttings)					Cost from vendor
Per Well Baseline Cost (\$/well)		\$161,419	\$110,715		
Unit Cost (\$/bbl)		\$116	\$115		
No. Wells		0	2		
TOTAL ANNUAL BASELINE GOM OBF COST (\$)		\$0	\$221,430	\$221,430	
Drilling Fluid Costs for Wells Currently Using WBF					
(WBF@ \$45/bbl lost w/ cuttings)					Cost from vendor
Per Well Baseline Cost (\$/well)		\$906,022	\$627,810	haul inject	
			\$387,454		
Unit Cost (\$/bbl)		\$91	\$86		
No. Wells Fail Limits		1	3		
No. Wells		11	27		
TOTAL ANNUAL BASELINE GOM WBF COST (\$)		\$906,022	\$1,643,075	\$2,549,097	
TOTAL ANNUAL BASELINE GOM COST (\$)				\$4,923,067	



**Summary Compliance Costs for Management of Large Volume SBF Wastes,  
New + Existing Sources ( '40% OBF Wells, 6% WBF Wells Convert'), 1999\$  
Lower (0%) WBF Failure Rate Boundary**

**Baseline Costs: Total Annual**

Baseline Technology	GOM	CA	AK(CI)	Total Per Technol	NOTES
Discharge with 9.42% retention of base fluid on cuttings ( _xxx_ SBF wells in GOM)	31,590,403	0	0	31,590,403	Worksheet No. 1
Zero Discharge--current OBF users only (xxxx GOM wells; xxxx CA wells; xxxx AK well)	10,255,726	413,282	516,602	11,185,610	Worksheet No.s 1, 2, and 3
Zero Discharge--current WBF users only (xxxx GOM wells; xxxx CA wells; xxxx AK well)	0	0	0	0	
<b>TOTAL Per Region</b>	<b>41,846,129</b>	<b>413,282</b>	<b>516,602</b>	<b>42,776,013</b>	

**Compliance Costs: Total Annual**

	Technology Option	GOM	CA	AK(CI)	Total Per Technol	NOTES
BAT-1	BAT-1: Discharge from Cuttings Dryer and Fines Removal Unit (R = 3.68%)*	37,471,928	0	266,864	37,738,792	Worksheet No.s 4, 5, and 6
	Zero Discharge--current OBF users only (xxxx GOM wells; xxxx CA wells; xxxx AK well)	6,103,696	413,282	349,706	6,866,684	
	Zero Discharge--current WBF users only (xxxx GOM wells; xxxx CA wells; xxxx AK well)	0	0	0	0	
	<b>TOTAL Per Region</b>	<b>43,575,624</b>	<b>413,282</b>	<b>616,570</b>	<b>44,605,476</b>	
BAT-2	BAT-2: Discharge from Cuttings Dryer (R = 3.48%) and Zero Discharge of Fines*	37,656,164	0	266,864	37,923,028	Worksheet No.s 7, 8, and 9
	Zero Discharge--current OBF users only (xxxx GOM wells; xxxx CA wells; xxxx AK well)	6,103,696	413,282	349,706	6,866,684	
	Zero Discharge--current WBF users only (xxxx GOM wells; xxxx CA wells; xxxx AK well)	0	0	0	0	
	<b>TOTAL Per Region</b>	<b>43,759,860</b>	<b>413,282</b>	<b>616,570</b>	<b>44,789,712</b>	
BAT-3	BAT 3 Zero Discharge (xxxx current SBF wells)	6,029,147	0	0	6,029,147	Worksheet No.s 10, 11, and 12
	Zero Discharge--current OBF users only (xxxx GOM wells; xxxx CA wells; xxxx AK well)	64,925,253	413,282	516,602	65,855,137	
	Zero Discharge--current WBF users only (xxxx GOM wells; xxxx CA wells; xxxx AK well)	0	0	0	0	
	<b>TOTAL Per Region</b>	<b>70,954,400</b>	<b>413,282</b>	<b>516,602</b>	<b>71,884,284</b>	

**Incremental Compliance Costs: Total Annual**

	Technology Option	GOM	CA	AK(CI)	Total Per Technol	NOTES
	BAT-1: Discharge from Cuttings Dryer and Fines Removal Unit	1,729,495	0	99,968	1,829,463	BAT-1 compliance cost :: total baseline cost differential
	BAT-2: Discharge from Cuttings Dryer and Zero Discharge of Fines	1,913,731	0	99,968	2,013,699	BAT-2 compliance cost :: total baseline cost differential
	Zero Discharge**	29,108,271	0	0	29,108,271	BAT-3 (ZD) compliance cost :: GOM baseline cost differential

**WBF-related Costs (Savings)**

	Technology Option	GOM	CA	AK(CI)	Total Per Technol	NOTES
	BAT-1: ROP-related rig cost savings	(34,720,000)	0	0	(50,956,045)	
	Discharged WBF cost savings	(16,236,045)	0	0		
	Zero discharge cost savings	0	0	0		
	BAT-2: ROP-related rig cost savings	(34,720,000)	0	0	(50,956,045)	
	Discharged WBF cost savings	(16,236,045)	0	0		
	Zero discharge cost savings	0	0	0		

**NET Incremental Compliance Costs: Total Annual**

	Technology Option	GOM	CA	AK(CI)	Total Per Technol	NOTES
	BAT-1: Discharge from Cuttings Dryer and Fines Removal Unit	(49,226,550)	0	99,968	(49,126,582)	BAT-1 compliance cost :: total baseline cost differential
	BAT-2: Discharge from Cuttings Dryer and Zero Discharge of Fines	(49,042,314)	0	99,968	(48,942,346)	BAT-2 compliance cost :: total baseline cost differential
	Zero Discharge**	29,108,271	0	0	29,108,271	BAT-3 (ZD) compliance cost :: total baseline cost differential

**Summary Compliance Costs for Management of Large Volume SBF Wastes,  
New Sources ( '40% OBF Wells, 6% WBF Wells Convert'), 1999\$  
Lower (0%) WBF Failure Rate Boundary**

**Baseline Costs: Total Annual**

Baseline Technology	GOM	CA	AK(CI)	Total Per Technol	NOTES
Discharge with 9.42% retention of base fluid on cuttings ( _xxx_ SBF wells in GOM)	2,152,540	0	0	2,152,540	Worksheet No. 1
Zero Discharge--current OBF users only (xxxx GOM wells; xxxx CA wells; xxxx AK well)	221,430	0	0	221,430	Worksheet No.s 1, 2, and 3
Zero Discharge--current WBF users only (xxxx GOM wells; xxxx CA wells; xxxx AK well)	0	0	0	0	
<b>TOTAL Per Region</b>	<b>2,373,970</b>	<b>0</b>	<b>0</b>	<b>2,373,970</b>	

**Compliance Costs: Total Annual**

	Technology Option	GOM	CA	AK(CI)	Total Per Technol	NOTES
BAT-1	BAT-1: Discharge from Cuttings Dryer and Fines Removal Unit (R = 3.68%)*	1,902,672	0	0	1,902,672	Worksheet No.s 4, 5, and 6
	Zero Discharge--current OBF users only (xxxx GOM wells; xxxx CA wells; xxxx AK well)	110,715	0	0	110,715	
	Zero Discharge--current WBF users only (xxxx GOM wells; xxxx CA wells; xxxx AK well)	0	0	0	0	
	<b>TOTAL Per Region</b>	<b>2,013,387</b>	<b>0</b>	<b>0</b>	<b>2,013,387</b>	
BAT-2	BAT-2: Discharge from Cuttings Dryer (R = 3.48%) and Zero Discharge of Fines*	1,906,776	0	0	1,906,776	Worksheet No.s 7, 8, and 9
	Zero Discharge--current OBF users only (xxxx GOM wells; xxxx CA wells; xxxx AK well)	110,715	0	0	110,715	
	Zero Discharge--current WBF users only (xxxx GOM wells; xxxx CA wells; xxxx AK well)	0	0	0	0	
	<b>TOTAL Per Region</b>	<b>2,017,491</b>	<b>0</b>	<b>0</b>	<b>2,017,491</b>	
BAT-3	BAT 3 Zero Discharge (xxxx current SBF wells)	710,889	0	0	710,889	Worksheet No.s 10, 11, and 12
	Zero Discharge--current OBF users only (xxxx GOM wells; xxxx CA wells; xxxx AK well)	2,039,092	0	0	2,039,092	
	Zero Discharge--current WBF users only (xxxx GOM wells; xxxx CA wells; xxxx AK well)	0	0	0	0	
	<b>TOTAL Per Region</b>	<b>2,749,981</b>	<b>0</b>	<b>0</b>	<b>2,749,981</b>	

**Incremental Compliance Costs: Total Annual**

Technology Option	GOM	CA	AK(CI)	Total Per Technol	NOTES
BAT-1: Discharge from Cuttings Dryer and Fines Removal Unit	(360,583)	0	0	(360,583)	BAT-1 compliance cost :: total baseline cost differential
BAT-2: Discharge from Cuttings Dryer and Zero Discharge of Fines	(356,479)	0	0	(356,479)	BAT-2 compliance cost :: total baseline cost differential
Zero Discharge**	376,011	0	0	376,011	BAT-3 (ZD) compliance cost :: GOM baseline cost differential

**WBF-related Costs (Savings)**

	Technology Option	GOM	CA	AK(CI)	Total Per Technol	NOTES
BAT-1:	ROP-related rig cost savings	(1,440,000)	0	0	(2,123,505)	
	Discharged WBF cost savings	(683,505)	0	0		
	Zero discharge cost savings	0	0	0		
BAT-2:	ROP-related rig cost savings	(1,440,000)	0	0	(2,123,505)	
	Discharged WBF cost savings	(683,505)	0	0		
	Zero discharge cost savings	0	0	0		

**NET Incremental Compliance Costs: Total Annual**

	Technology Option	GOM	CA	AK(CI)	Total Per Technol	NOTES
	BAT-1: Discharge from Cuttings Dryer and Fines Removal Unit	(2,484,088)	0	0	(2,484,088)	BAT-1 compliance cost :: total baseline cost differential
	BAT-2: Discharge from Cuttings Dryer and Zero Discharge of Fines	(2,479,984)	0	0	(2,479,984)	BAT-2 compliance cost :: total baseline cost differential
	Zero Discharge**	376,011	0	0	376,011	BAT-3 (ZD) compliance cost :: total baseline cost differential

**Worksheet No. 14**
**Compliance Cost Estimates (1999\$): Discharge from Cuttings Dryer and FRUs  
(BAT 1 Technology) New Sources; Gulf of Mexico**

Technology:		Discharge via add-on drill cuttings "dryer;" fines removal unit, avg retention 4.03% (wt) base fluid on cuttings		
Model Well Types:		Deep- and Shallow-water Development		
Per-Well Waste Volumes:				
Deep-water Development:		1,035 bbls waste SBF cuttings (0.2% crude contamination) 180 bbls SBF lost with cuttings		
Shallow-water Development:		684 bbls waste SBF cuttings (0.2% crude contamination) 119 bbls SBF lost with cuttings		
Cost Item		DWD	SWD	TOTAL
GOM Wells Currently Using SBF and Discharging Cuttings				
BAT Solids Control Equipment @ \$2400/day x rental days (Cuttings dryer plus fines removal unit that reduces base fluid retention from 10.2% to 4.03%)	\$47,400	\$31,200		Includes all equipment, labor, and materials; days of rental from industry
Drilling Fluid Costs (SBF lost with cuttings @ \$221/bbl)	\$39,780	\$26,299		Cost from vendor
Monitoring Analyses				
SedTox Test	\$575	\$575		
Crude Contamination of Drilling Fluid @ \$50/test	\$50	\$50		Cost from vendor
Retention of Base Fluids by Retort @ \$50/test	\$1,300	\$1,500		Retort measured once per both discharge points/ 500 ft
TOTAL Cost Per Well (\$)	\$89,105	\$59,624		
Unit Cost (\$/bbl)	\$86	\$87		
No. Wells	16	8		
TOTAL ANNUAL GOM Cost for SBF Wells (\$)	\$1,425,680	\$476,992	\$1,902,672	
GOM Wells Currently Using OBF and Zero Discharge				
Disposal Cost (\$10.13/bbl)		\$9,289		Includes all equipment, labor, and materials; days of rental from industry
Handling Cost (\$4.75/bbl)		\$4,356		
Container Rental (\$25/box/day * "x" boxes* "y" days to fill & haul)	NA	\$7,127		Cost from vendor
Supply Boat Cost (\$8,500/day x days to fill and haul)		\$62,135		
Drilling Fluid Costs (OBF lost with cuttings @ \$79/bbl)		\$27,808		
TOTAL Cost Per Well (\$)		\$110,715		
Unit Cost (\$/bbl)		\$121		
No. Wells	0	1		
TOTAL ANNUAL GOM Cost for OBF Wells (\$)	\$0	\$110,715	\$110,715	Per-well costs x no. of wells
GOM Wells Currently Using WBF and Zero Discharge				
Unit Cost to Haul and Dispose (\$/well)	\$906,022	\$627,810		Includes all equipment, labor, and materials; days of rental from industry
Unit Cost to Grind and Inject (\$/well)	\$543,102	\$387,454		Cost from vendor
Wtd Avg TOTAL Cost Per Well (\$)	\$833,438	\$579,739		
Unit Cost (\$/bbl)	\$91	\$86		
No. Wells Fail Limits	1	3		
No. Wells	10	25		
TOTAL ANNUAL GOM Cost for WBF Wells (\$)	\$906,022	\$1,643,075	\$2,549,097	
TOTAL ANNUAL GOM Cost for Wells (\$)		\$4,562,484		

## Worksheet No. 15

### Compliance Cost Estimates (1999\$): Discharge from Cuttings Dryer and FRUs (BAT 2 Technology) New Sources; Gulf of Mexico

Technology:		Discharge via add-on drill cuttings "dryer," avg retention 3.82% (wt) base fluid on cuttings; zero discharge of fines																	
Model Well Types:		Deep- and Shallow-water Development																	
Per-Well Waste Volumes:		<table><tr><td></td><td>DWD</td><td>SWD</td></tr><tr><td>Waste Cuttings @ 3.82% Retention, bbl</td><td>999</td><td>660</td></tr><tr><td>SBF Lost with Cuttings, bbl</td><td>166</td><td>109</td></tr><tr><td>Waste Fines @ 10.2% Retention, bbl</td><td>36</td><td>24</td></tr><tr><td>SBF Lost with Fines, bbl</td><td>14</td><td>9</td></tr></table>				DWD	SWD	Waste Cuttings @ 3.82% Retention, bbl	999	660	SBF Lost with Cuttings, bbl	166	109	Waste Fines @ 10.2% Retention, bbl	36	24	SBF Lost with Fines, bbl	14	9
	DWD	SWD																	
Waste Cuttings @ 3.82% Retention, bbl	999	660																	
SBF Lost with Cuttings, bbl	166	109																	
Waste Fines @ 10.2% Retention, bbl	36	24																	
SBF Lost with Fines, bbl	14	9																	
Cost Item	DWD	SWD	TOTAL																
GOM Wells Currently Using SBF and Discharging Cuttings: Discharged Portion, Cuttings Dryer																			
BAT Solids Control Equipment @ \$2400/day x rental days (Cuttings dryer plus fines removal unit that reduces base fluid retention from 10.2 to 4.03%)	\$47,400	\$31,200		Includes all equipment, labor, and materials; days of rental from industry															
Drilling Fluid Costs (SBF lost with cuttings @ \$221/bbl)	\$36,686	\$24,089																	
Monitoring Analyses																			
SedTox Test	\$575	\$575																	
Crude Contamination of Drilling Fluid @ \$50/test	\$50	\$50																	
Retention of Base Fluids by Retort @ \$50/test	\$650	\$750		Cost from vendor Retort measured once / single discharge point/ 500 ft drilled;															
TOTAL Cost Per Well (\$)	\$85,361	\$56,664																	
Unit Cost (\$/bbl)	\$85	\$86																	
No. Wells	16	8																	
TOTAL ANNUAL GOM Cost for SBF Wells (\$)	\$1,365,776	\$453,312	1,819,088	Per-well costs x no. of wells															
Zero Discharge Fines Portion																			
Zero Discharge of Fines via Hauling																			
Disposal Costs @ 10.13/bbl	\$365	\$243		See Worksheet 4 See Worksheet 4 Orentas 2000															
Handling Costs @ 4.75/bbl	\$171	\$114																	
Container Rental @ \$25/box/day x days to fill	\$495	\$366																	
Drilling Fluid Costs @ \$221/bbl SBF lost with fines	\$3,094	\$1,989		Cost from vendor															
Total Cost per Well, Fines Portion	\$4,125	\$2,712																	
No. Wells	16	8																	
TOTAL ANNUAL GOM Cost for SBF Wells (\$)	\$65,995	\$21,693	87,688																
GOM Wells Currently Using OBF and Zero Discharge																			
Disposal Cost (\$10.13/bbl)		\$9,289		Includes all equipment, labor, and materials; days of rental from industry															
Handling Cost (\$4.75/bbl)		\$4,356																	
Container Rental (\$25/box/day * "x" boxes* "y" days to fill & haul)	NA	\$7,127		Cost from vendor															
Supply Boat Cost (\$8,500/day)		\$62,135																	
Drilling Fluid Costs (OBF lost with cuttings @ \$79/bbl)		\$27,808																	
TOTAL Cost Per Well (\$)		\$110,715																	
Unit Cost (\$/bbl)		\$121																	
No. Wells	0	1																	
TOTAL ANNUAL GOM Cost for OBF Wells (\$)	\$0	\$110,715	\$110,715	Per-well costs x no. of wells															
GOM Wells Currently Using WBF and Zero Discharge																			
Unit Cost to Haul and Dispose (\$/well)	\$906,022	\$627,810		Includes all equipment, labor, and materials; days of rental from industry															
Unit Cost to Grind and Inject (\$/well)	\$543,102	\$387,454																	
Wtd Avg TOTAL Cost Per Well (\$)	\$833,438	\$579,739																	
Unit Cost (\$/bbl)	\$91	\$86																	
No. Wells Fail Limits	1	3																	
No. Wells	10	25																	
TOTAL ANNUAL GOM Cost for WBF Wells (\$)	\$906,022	\$1,643,075	\$2,549,097	Per-well costs x no. of wells															
TOTAL ANNUAL GOM Cost for Wells (\$)			\$4,566,588																
Percentage WBF Wells Projected to Fail Sheen/Toxicity Limit and Have a Zero Discharge Restriction:			10.73%																
Zero Discharge of Fines via Hauling:																			
Disposal Costs @ \$10.13/bbl	10.13	See Worksheet 10																	
Handling Cost @ \$4.75/bbl	4.75	See Worksheet 10																	
Container Rental @ \$25/box/day	25	Orentas 2000																	
Number boxes	2	2																	
Number days to fill and haul	9.90	7.31																	
SedTox Test	575																		

# Worksheet No. 16

## Compliance Cost Estimates (1999\$): Zero Discharge (BAT 3 Technology) New Sources; Gulf of Mexico

Technology:		Zero-Discharge via Haul and Land-Dispose	
Model Well Types:		Deep- and Shallow-water Development	
Per-Well Waste Volumes:			
Deep-water Development:		1,387 bbls waste SBF (OBF) cuttings (0.2% crude contamination)	
		532 bbls SBF (OBF) lost with cuttings	
Shallow-water Development:		917 bbls waste OBF (SBF) cuttings (0.2% crude contamination)	
		352 bbls OBF (SBF) lost with cuttings	
Cost Item	DWD	SWD	
<b>GOM Wells Using SBF Assumed to Switch to OBF Under Zero Discharge</b>			
Disposal Cost (\$10.13/bbl)	\$14,050	\$9,289	Average of \$9.50 and \$10.75, quoted from vendors
Handling Cost (\$4.75/bbl)	\$6,588	\$4,356	Vendor quote; includes crains, labor, trucks to landfill, etc.
Container Rental (\$25/box/day * "x" boxes* "y" days to fill & haul)	\$14,603	\$7,127	Vendor cost estimate; 39 boxes estimated capacity required
Supply Boat Cost (\$8,500/day)	\$84,150	\$62,135	Vendors
Drilling Fluid Costs (OBF lost with cuttings @ \$79/bbl)	\$42,028	\$27,808	Vendor quote
<b>TOTAL Cost per Model Well (\$)</b>	<b>\$161,419</b>	<b>\$110,715</b>	
Unit Cost to Haul and Dispose (\$/bbl)	\$176	\$121	
<b>GOM Wells Using SBF Assumed to Retain SBF Under Zero Discharge</b>			
Disposal Cost (\$10.13/bbl)	\$14,050	\$9,289	Average of \$9.50 and \$10.75, quoted from vendors
Handling Cost (\$4.75/bbl)	\$6,588	\$4,356	Vendor quote; includes crains, labor, trucks to landfill, etc.
Container Rental (\$25/box/day * "x" boxes* "y" days to fill & haul)	\$14,603	\$7,127	Vendor cost estimate; 39 boxes estimated capacity required
Supply Boat Cost (\$8,500/day)	\$84,150	\$62,135	Vendors
Drilling Fluid Costs (SBF lost with cuttings @ \$221/bbl)	\$117,572	\$77,792	Vendor quote
<b>TOTAL Cost per Model Well (\$)</b>	<b>\$236,963</b>	<b>\$160,699</b>	
Unit Cost to Haul and Dispose (\$/bbl)	\$171	\$175	
<b>GOM Wells Using WBF Assumed to Retain WBF Under Zero Discharge</b>			
Disposal Cost (\$10.13/bbl)	\$102,495	\$75,681	Average of \$9.50 and \$10.75, quoted from vendors
Handling Cost (\$4.75/bbl)	\$48,061	\$35,487	Vendor quote; includes crains, labor, trucks to landfill, etc.
Container Rental (\$25/box/day * "x" boxes* "y" days to fill & haul)	\$213,124	\$116,198	Vendor cost estimate; 39 boxes estimated capacity required
Supply Boat Cost (\$8,500/day)	\$168,300	\$124,270	Vendors
Drilling Fluid Costs (WBF lost with cuttings @ \$45/bbl)	\$374,042	\$276,174	Vendor quote
<b>TOTAL Cost per Model Well (\$)</b>	<b>\$906,022</b>	<b>\$627,810</b>	
Unit Cost to Haul and Dispose (\$/bbl)	\$90	\$84	

# Worksheet No. 17

## Compliance Cost Estimates (1999\$): Zero Discharge (BAT 3 Technology)

### New Sources; Gulf of Mexico

Technology:		Zero-Discharge via On-site Grinding and Injection	
Model Well Types:		Deep- and Shallow-water Development	
Per-Well Waste Volumes:			
Deep-water Development:	1,387	bbls waste SBF cuttings (0.2% crude contamination)	
	532	bbls SBF lost with cuttings	
Shallow-water Development:	917	bbls waste OBF cuttings (0.2% crude contamination)	
	352	bbls OBF lost with cuttings	
Cost Item	DWD	SWD	Information below is detailed in
GOM Wells Using SBF Assumed to Switch to OBF Under Zero Discharge			
Onsite Injection System @ \$4280/day (drilling days = 40% of time on rig, thus rental days = 2.5 x drilling days)	NA	\$ 55,640	Includes all equipment, labor, and services; vacuum system used to transport cuttings
Drilling Fluid Costs (OBF lost with cuttings @ \$79/bbl)		\$ 27,808	Cost from vendor
TOTAL Cost per Model Well (\$)		\$ 83,448	
Unit Cost to Grind and Inject (\$/bbl)		\$ 91	
GOM Wells Using SBF Assumed to Retain SBF Under Zero Discharge			
Onsite Injection System @ \$4280/day (drilling days = 40% of time on rig)	NA	\$ 55,640	Includes all equipment, labor, and services; vacuum system used to transport cuttings
Drilling Fluid Costs (SBF lost with cuttings @ \$221/bbl)		\$ 77,792	Cost from vendor
TOTAL Cost per Model Well (\$)		\$ 133,432	
Unit Cost to Grind and Inject (\$/bbl)		\$ 146	
GOM Wells Using WBF Assumed to Retain WBF Under Zero Discharge			
Onsite Injection System @ \$4280/day (drilling days = 40% of time on rig)	\$ 169,060	\$ 111,280	Includes all equipment, labor, and services; vacuum system used to transport cuttings
Drilling Fluid Costs (SBF lost with cuttings @ \$45/bbl)	\$ 374,042	\$ 276,174	Cost from vendor
TOTAL Cost per Model Well (\$)	\$ 543,102	\$ 387,454	
Unit Cost to Grind and Inject (\$/bbl)	\$ 54	\$ 52	
Drilling days	7.9	5.2	
drilling days = 40% of time on rig	0.4	0.4	
Onsite Injection System, /day	4280	4280	

## Worksheet No. 18

Compliance Cost Estimates (1999\$): Zero Discharge (BAT 3 Technology)  
New Sources; Gulf of Mexico

Technology:		Deep- and 80% Shallow-water Wells Haul & Land-Dispose; 20% Shallow Inject		
Model Well Types:		Deep- and Shallow-water Development		
Per-Well Waste Volumes:				
Deep-water Development:		1,387 bbls waste SBF cuttings (0.2% crude contamination)		
		532 bbls SBF lost with cuttings		
Shallow-water Development:		917 bbls waste OBF cuttings (0.2% crude contamination)		
		352 bbls OBF lost with cuttings		
Cost Item	DWD	SWD	TOTAL	Notes
GOM Wells Using SBF Assumed to Switch to OBF Under Zero Discharge				
Unit Cost to Haul and Dispose (\$/well)	161,419	110,715		From Worksheet No. 3
Unit Cost to Grind and Inject (\$/well)	NA	83,448		From Worksheet No. 4
Weighted Average Per Well Cost (\$/well)	161,419	105,262		Assumes 80% of shallow water wells haul,
Weighted Average Unit Cost (\$/bbl)	116	115		
No. Wells	8	7		
SUBTOTAL ANNUAL GOM ZD COST (\$)	1,291,352	747,739	2,039,092	
GOM Wells Using SBF Assumed to Retain SBF Under Zero Discharge				
Unit Cost to Haul and Dispose (\$/well)	236,963	160,699		From Worksheet No. 3
Unit Cost to Grind and Inject (\$/well)	NA	133,432		
Weighted Average Per Well Cost (\$/well)	236,963	155,246		Assumes 100% of deep water wells haul
Weighted Average Unit Cost (\$/bbl)	171	146		
No. Wells	3	0		
SUBTOTAL ANNUAL GOM ZD COST (\$)	710,889	0	710,889	
GOM Wells Using WBF Assumed to Retain WBF Under Zero Discharge				
Unit Cost to Haul and Dispose (\$/well)	906,022	627,810		From Worksheet No. 3
Unit Cost to Grind and Inject (\$/well)	543,102	387,454		
Weighted Average Per Well Cost (\$/well)	833,438	579,739		Assumes 100% of deep water wells haul
Weighted Average Unit Cost (\$/bbl)	91	86		
No. Wells Fail Limits	2	3		
No. Wells	15	27		
SUBTOTAL ANNUAL GOM ZD COST (\$)	1,812,044	1,643,075	3,455,119	
Total Annual GOM Costs for Zero Discharge (\$)			6,205,100	

Worksheet No. 19										
Compliance Cost Estimates (1999\$), Small Volume SBF Wastes										
BAT Option (Zero Discharge)										
[ Estimated Small-Volume Waste Amount per well = 75 bbls ]										
Cost Item	Cost	Existing Sources			New Sources			Total Existing & New Sources		
		Baseline	BAT 1 & 2	BAT 3	Baseline	BAT 1 & 2	BAT 3	Baseline	BAT 1 & 2	BAT 3
<b>GOM</b>										
(Costs from Wksht No. 10)										
Disposal cost @ \$10.13/bbl	\$760									
Handling cost @ 4.75/bbl	\$356									
Container rental @ \$25/25-bbl box/day	\$105									
Cost Per Well	\$1,221									
Total Number of Wells		201	264	11	20	24	3	221	288	14
<b>Total Regional Cost</b>		<b>\$245,421</b>	<b>\$322,344</b>	<b>\$13,431</b>	<b>\$24,420</b>	<b>\$29,304</b>	<b>\$3,663</b>	<b>\$269,841</b>	<b>\$351,648</b>	<b>\$17,094</b>
<b>CALIFORNIA</b>										
(no longer applicable: no SBF wells)										
Disposal cost @ \$12.47/bbl	\$935									
Handling cost @ \$5.86/bbl	\$440									
Container Rental @ \$40/25-bbl box/day	\$120									
Trucking cost @ \$354/50-bbl truckload	\$708									
Cost Per Well	\$2,203									
Total Number of Wells		0	0	0	0	0	0	0	0	0
<b>Total Regional Cost</b>		<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
<b>COOK INLET (not applicable; wastes injected onsite, no add'l cost)</b>										
Disposal cost @ \$540 per 8-bbl box	\$5,400									
8-bbl box purchase cost @ \$135/box	\$1,350									
Trucking cost @ \$1,944 per 8-box truckload	\$3,888									
Cost Per Well	\$10,638									
Total Number of Wells		0	0	0	0	0	0	0	0	0
<b>Total Regional Cost</b>		<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
<b>Total Annual Cost</b>		<b>\$245,421</b>	<b>\$322,344</b>	<b>\$13,431</b>	<b>\$24,420</b>	<b>\$29,304</b>	<b>\$3,663</b>	<b>\$269,841</b>	<b>\$351,648</b>	<b>\$17,094</b>



## Worksheet No. 20:

### WBF Upper Bound (10.73%) Analysis for Zero Discharge Wells

(Costs incurred only if WBF wells are projected to fail toxicity of sheen limits)

#### WBF Disposal Analysis

WBF Waste Volumes (per ODD data)

Deep-water Devel	1,901	bbls cuttings
	8,217	bbls WBF discharged
Deep-water Explor	4,376	bbls cuttings
	18,916	bbls WBF discharged
Shallow-water Develop	1,404	bbls cuttings
	6,067	bbls WBF discharged
Shallow-water Explor	2,723	bbls cuttings
	11,769	bbls WBF discharged

#### WBF Disposal Analysis

	DWD	DWE	SWD	SWE
Disposal Cost (\$10.13/bbl)	\$102,495	\$235,948	\$75,681	\$146,804
Handling Cost (\$4.75/bbl)	\$48,061	\$110,637	\$35,487	\$68,837
Container Rental x WBF days to fill and haul	\$213,124	\$1,129,414	\$116,198	\$437,227
Supply Boat Cost (\$8,500/day) x WBF days to fill and haul	\$168,300	\$387,430	\$124,270	\$241,060
Drilling Fluid Costs	\$374,042	\$861,066.00	\$276,174	\$535,732
TOTAL Cost / Model Well (\$)	\$906,022	\$2,724,495	\$627,810	\$1,429,659

5.00%	adherent drilling fluid
\$45.00	per bbl, WBF

## Worksheet No. 21: Baseline Current Practice (BPT), Existing Sources, California

### WBF Upper Bound (10.73%) Analysis for Zero Discharge Wells

(Costs incurred only if WBF wells are projected to fail their toxicity or sheen limits)

WBF Cuttings, bbl/well (from ODD)	DWD	1,901	bbls waste cuttings		
WBDrilling Fluid, bbl/well (from ODD)	DWD	8,217	bbls WBF discharged		
WBF Cuttings, bbl/well (from ODD)	DWE	4,376	bbls waste cuttings		
WBDrilling Fluid, bbl/well (from ODD)	DWE	18,916	bbls WBF discharged		
WBF Cuttings, bbl/well (from ODD)	SWD	1,404	bbls waste cuttings		
WBDrilling Fluid, bbl/well (from ODD)	SWD	6,067	bbls WBF discharged		
WBF Cuttings, bbl/well (from ODD)	SWE	2,723	bbls waste cuttings		
WBDrilling Fluid, bbl/well (from ODD)	SWE	11,769	bbls WBF discharged		
% WBF wells projected to fail toxicity and/or /sheen limitations		10.73%			
<b>WBF HAUL &amp; LAND DISPOSE COSTS</b>	<b>DWD</b>	<b>DWE</b>	<b>SWD</b>	<b>SWE</b>	
Disposal Cost (\$ 8.41/bbl)	\$85,123	\$195,957	\$62,855	\$121,922	
Handling Cost (\$ 3.95/bbl)	\$40,008	\$92,100	\$29,542	\$57,304	
Container Rental (\$40/box/day * "x" boxes* "y" days to fill & haul)	\$341,352	\$1,804,968	\$186,551	\$703,328	
Supply Boat Cost (\$8,500/day x days to fill and haul)	\$168,300	\$387,430	\$124,270	\$241,060	
Trucking Cost (\$354/truck load)	\$76,582	\$175,855	\$56,727	\$109,909	
Drilling Fluid Costs (WBF lost with cuttings @ \$72/bbl)	\$728,496	\$1,677,024	\$537,912	\$1,043,424	
No. Wells	0	0	3	2	
<b>Total Cost / WBF Well (Haul)</b>	<b>\$1,439,861</b>	<b>\$4,333,333</b>	<b>\$997,860</b>	<b>\$2,276,949</b>	
<b>No. Wells Fail Limits</b>	0	0	0	0	
<b>TOTAL CA WBF Haul &amp; Land Dispose Costs</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
Unit Costs	<b>DWD</b>	<b>DWE</b>	<b>SWD</b>	<b>SWE</b>	
bbl waste, OBF	1,387	3,085	917	1,921	
no. bxx waste, OBF	59	131	39	82	
bbl/bx	23.5	23.5	23.5	23.4	
bbl WBF, tot	10,118	23,292	7,471	14,492	
bxx WBF	431	990	319	620	
<b>Days to fill &amp; haul , WBF</b>	<b>19.8</b>	<b>45.58</b>	<b>14.62</b>	<b>28.36</b>	
Container Rental	\$40	\$40	\$40	\$40	
bx/trk	2	2	2	2	
no trks	216	496	160	310	
cost/truck	\$355	\$355	\$355	\$355	
WBF cost (+CA multiplier, 1.6)	\$72.00	\$72.00	\$72.00	\$72.00	

# Worksheet No. 21A: Baseline Current Practice (BPT), Existing Sources, California

## WBF Upper Bound (10.73%) Analysis for Zero Discharge Wells

(Costs incurred only if WBF wells are projected to fail their toxicity or sheen limits)

WBF Cuttings, bbl/well (from ODD)	DWD	1,901	bbls waste cuttings		
WBDrilling Fluid, bbl/well (from ODD)	DWD	8,217	bbls WBF discharged		
WBF Cuttings, bbl/well (from ODD)	DWE	4,376	bbls waste cuttings		
WBDrilling Fluid, bbl/well (from ODD)	DWE	18,916	bbls WBF discharged		
WBF Cuttings, bbl/well (from ODD)	SWD	1,404	bbls waste cuttings		
WBDrilling Fluid, bbl/well (from ODD)	SWD	6,067	bbls WBF discharged		
WBF Cuttings, bbl/well (from ODD)	SWE	2,723	bbls waste cuttings		
WBDrilling Fluid, bbl/well (from ODD)	SWE	11,769	bbls WBF discharged		
% WBF wells projected to fail toxicity and/or /sheen limitations		10.73%			
<b>WBF GRIND &amp; INJECT COSTS</b>	<b>DWD</b>	<b>DWE</b>	<b>SWD</b>	<b>SWE</b>	
Onsite Injection System @ \$4280/day x rental days x CA geographic multiplier	\$299,600	\$135,248	\$89,024	\$186,608	
Drilling Fluid Costs	\$728,496	\$1,677,024	\$537,912	\$1,043,424	
<b>Total Cost / WBF Well (Grind &amp; Inject)</b>	<b>\$1,028,096</b>	<b>\$1,812,272</b>	<b>\$626,936</b>	<b>\$1,230,032</b>	
Unit Cost (\$/bbl)	\$102	\$78	\$84	\$0	
No. Wells Fail Limits	0	0	0	0	
No. Wells	0	0	1	1	
<b>TOTAL CA WBF Grind &amp; Inject Costs</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
Unit Costs	<b>DWD</b>	<b>DWE</b>	<b>SWD</b>	<b>SWE</b>	
Onsite Inject System	\$4,280	\$4,280	\$4,280	\$4,280	
Drilling days	17.5	7.9	5.2	10.9	
Drilling days :Operating Days	0.4	0.4	0.4	0.4	
<b>Rental Days</b>	<b>43.8</b>	<b>19.8</b>	<b>13.0</b>	<b>27.3</b>	
Geographic multiplier	1.6	1.6	1.6	1.6	
WBF Drilling Fluid	\$45.00	\$45.00	\$45.00	\$45.00	
bbl WBF Lost to Disposal	10,118	23,292	7,471	14,492	
lb/bbl wet cuttings (cuttings + 5% df)	566				
lb/bbl WBF	461				
Disposal Cost (\$ 8.41/bbl)	\$85,123	\$195,957	\$62,855	\$121,922	
WBDrilling Fluid + Cuttings, bbl/well (from ODD)	10,118	23,292	7,471	14,492	

# Worksheet No. 22A: BPT, Existing Sources, Alaska

## WBF Upper Bound (10.73%) Analysis for Zero Discharge Wells

(Costs incurred only if WBF wells are projected to fail their toxicity or sheen limits)

WBDrilling Fluid, bbl/day (from ODD)

SWD	1,404 bbls waste cuttings (0.2% crude contamination)
SWD	6,067 bbls WBF discharged
SWE	2,723 bbls waste cuttings (0.2% crude contamination)
SWE	11,769 bbls WBF discharged

### WBF DISPOSAL ANALYSIS

	DWD	DWE	SWD	SWE	
Onsite Injection System @ \$8560/day	NA	NA	\$222,560	\$466,520	2x factor for increased drilling time for WBF compared to OBF/SBF
Drilling Fluid Cost			\$27,302	\$52,961	
Total Cost / Model Well			\$249,862	\$519,481	
Unit Cost (\$/bbl)			\$178	\$191	
No. Wells			3	1	
No. Wells Fail Limts			0	0	
Onsite Injection System @ \$8560/day			\$0	\$0	
Total Annual Baseline WBF Cook Inlet Cost(\$)				\$0	

5.00% adherent fluid

\$90.00 /bbl, AK WBF

GOM WBF \$45.00

AK:GOM multiplier 2

% WBF wells projected to fail toxicity and/or /sheen limitations

10.73%

**WORKSHEET 23:**  
**WBF COST ADJUSTMENTS TO BAT 1 AND BAT 2 EXISTING SOURCE OPTIONS**

REDUCTION IN RIG TIME-ASSOCIATED COSTS					
	DWD	DWE	SWD	SWE	Totals
No. days, SBF interval	7.9	17.5	5.2	10.9	
WBF-to-SBF drilling efficiency	0.5	0.5	0.5	0.5	
Estimated days to drill, WBF	15.8	35.0	10.4	21.8	
Additional days required to drill, WBF	7.9	17.5	5.2	10.9	
Projected no. WBF > SBF wells (BAT 1,2)	1	2	32	19	
Estimated drilling day reductions	8	35	166	207	
Estimated average daily rig cost	\$80,000	\$80,000	\$80,000	\$80,000	
Estimated rig-time cost reductions, per well type	\$640,000	\$2,800,000	\$13,280,000	\$16,560,000	
Total estimated WBF zero discharge disposal costs, per well type					\$33,280,000
COST OF DISCHARGED WBF					
	DWD	DWE	SWD	SWE	
Estimated days to drill, WBF	15.8	35.0	10.4	21.8	
Average daily WBF discharge rate, bbl /day	415	415	415	415	
Projected no. WBF > SBF wells (BAT 1,2)	1	2	32	19	
Estimated drilling day reductions	15.8	70	332.8	414.2	
Average daily WBF discharge rate, bbl /day	415	415	415	415	
Estimated WBF discharge, bbl	6,557	29,050	138,112	171,893	
Estimated average WBF cost, per bbl	\$45.00	\$45.00	\$45.00	\$45.00	
Estimated WBF discharge costs, per well type	\$295,065	\$1,307,250	\$6,215,040	\$7,735,185	
Total estimated WBF zero discharge disposal cost					\$15,552,540
ZERO DISCHARGE COSTS, WBF WELLS PROJECTED TO FAIL PERMIT LIMITS AND REQUIRE ZERO DISCHARGE					
	DWD	DWE	SWD	SWE	
Projected no. WBF > SBF wells (BAT 1,2)	1	2	32	19	
% WBF wells failing permit limits	10.73%	10.73%	10.73%	10.73%	
Estimated WBF wells requiring zero discharge	0	0	3	2	
haul	0	0	2	2	
inject	0	0	1	0	
Estimated zero discharge cost per well					
haul	\$906,022	\$2,724,495	\$627,810	\$1,429,659	
inject	\$543,102	\$1,235,566	\$387,454	\$768,992	
Estimated zero discharge cost per well hauled	\$0	\$0	\$1,255,620	\$2,859,318	
Estimated zero discharge cost per well injected	\$0	\$0	\$387,454	\$0	
Estimated WBF zero discharge disposal costs, per well type	\$0	\$0	\$1,643,074	\$2,859,318	
Total estimated WBF zero discharge disposal costs,					\$4,502,392
Total estimated WBF cost adjustments					\$53,334,932

**WORKSHEET 23A:**  
**WBF COST ADJUSTMENTS TO BAT 1 AND BAT 2 NEW SOURCE OPTIONS**

REDUCTION IN RIG TIME-ASSOCIATED COSTS					
	DWD	DWE	SWD	SWE	Totals
No. days, SBF interval	7.9	17.5	5.2	10.9	
WBF-to-SBF drilling efficiency	0.5	0.5	0.5	0.5	
Estimated days to drill, WBF	15.8	35.0	10.4	21.8	
Additional days required to drill, WBF	7.9	17.5	5.2	10.9	
Projected no. WBF > SBF wells (BAT 1,2)	1	0	2	0	
Estimated drilling day reductions	8	0	10	0	
Estimated average daily rig cost	\$80,000	\$80,000	\$80,000	\$80,000	
Estimated rig-time cost reductions, per well type	\$640,000	\$0	\$800,000	\$0	
Total estimated WBF zero discharge disposal costs, per well type					\$1,440,000
COST OF DISCHARGED WBF					
	DWD	DWE	SWD	SWE	
Estimated days to drill, WBF	15.8	35.0	10.4	21.8	
Average daily WBF discharge rate, bbl /day	415	415	415	415	
Projected no. WBF > SBF wells (BAT 1,2)	1	0	2	0	
Estimated drilling day reductions	15.8	0	20.8	0	
Average daily WBF discharge rate, bbl /day	415	415	415	415	
Estimated WBF discharge, bbl	6,557	0	8,632	0	
Estimated average WBF cost, per bbl	\$45.00	\$45.00	\$45.00	\$45.00	
Estimated WBF discharge costs, per well type	\$295,065	\$0	\$388,440	\$0	
Total estimated WBF zero discharge disposal cost					\$683,505
ZERO DISCHARGE COSTS, WBF WELLS PROJECTED TO FAIL PERMIT LIMITS AND REQUIRE ZERO DISCHARGE					
	DWD	DWE	SWD	SWE	
Projected no. WBF > SBF wells (BAT 1,2)	1	0	2	0	
% WBF wells failing permit limits	10.73%	10.73%	10.73%	10.73%	
Estimated WBF wells requiring zero discharge	0	0	0	0	
haul	0	0	0	0	
inject	0	0	0	0	
Estimated zero discharge cost per well					
haul	\$906,022	\$2,724,495	\$627,810	\$1,429,659	
inject	\$543,102	\$1,235,566	\$387,454	\$768,992	
Estimated zero discharge cost per well hauled	\$0	\$0	\$0	\$0	
Estimated zero discharge cost per well injected	\$0	\$0	\$0	\$0	
Estimated WBF zero discharge disposal costs, per well type	\$0	\$0	\$0	\$0	
Total estimated WBF zero discharge disposal costs,					\$0
Total estimated WBF cost adjustments					\$2,123,505

## **APPENDIX VIII-3**

**(Deleted)**

## **APPENDIX VIII-4**

### **Pollutant Loadings (Removals) Worksheets**



**WORKSHEET No. 1:**  
**Deep Water Development Model Well**

**BPT Baseline Loadings                      Model Well:                      DWD                      Existing Sources**

Technology = Discharge Assuming 10.20% (wt) Retention on Discharged Cuttings and  
0.2% (vol.) Crude Contamination  
Dry Cuttings Generated per Well (lbs) = 778,050  
Whole Drilling Fluid Discharged per Well (bbl) = 533

Pollutant Name	Annual Pollutant Loadings (lbs.) per DWD Model SBF Well	Annual Pollutant Loadings (lbs.) per DWD Model OBF Well
<b>Conventional Pollutants</b>		
Total Oil as SBF Basefluid	101,357.9	0
Total Oil as Formation Oil	313.0	0
Total Oil (SBF Basefluid + Form. Oil)	101,670.9	0
TSS (associated with discharged SBF)	71,166.2	0
TSS (associated with dry cuttings)	778,050.0	0
TSS (total)	849,216.2	0
<b>Total Conventional Pollutants (this value used in subsequent eng./nwgi/ea/econ. modeling)</b>	<b>950,887.1</b>	<b>0.0</b>
<b>Priority Pollutant Organics</b>		
Naphthalene	0.5347	0
Fluorene	0.2916	0
Phenanthrene	0.6917	0
Phenol	0.0019	0
<b>Total Organic Priority Pollutants</b>	<b>1.5199</b>	<b>0.0</b>
<b>Priority Pollutants, Metals</b>		
Cadmium	0.0783	0
Mercury	0.0071	0
Antimony	0.4056	0
Arsenic	0.5053	0
Beryllium	0.0498	0
Chromium	17.0799	0
Copper	1.3308	0
Lead	2.4979	0
Nickel	0.9607	0
Selenium	0.0783	0
Silver	0.0498	0
Thallium	0.0854	0
Zinc	14.2688	0
<b>Total Metals Priority Pollutants</b>	<b>37.3978</b>	<b>0.0</b>

**BPT Baseline Loadings                      Model Well:                      DWD                      Existing Sources**

Technology = Discharge Assuming 10.20% (wt) Retention on Discharged Cuttings and  
0.2% (vol.) Crude Contamination

Pollutant Name	Annual Pollutant Loadings (lbs.) per DWD Model SBF Well	Annual Pollutant Loadings (lbs.) per DWD Model OBF Well
<b>Non-Conventional Pollutants</b>		
Aluminum	645.4704	0
Barium	41845.7278	0
Iron	1091.9956	0
Tin	1.0390	0
Titanium	6.2270	0
Alkylated benzenes	3.0099	0
Alkylated naphthalenes	28.2970	0
Alkylated fluorenes	3.4063	0
Alkylated phenanthrenes	4.3036	0
Alkylated phenols	0.0166	0
Total biphenyls	5.5936	0
Total dibenzothiophenes	0.2384	0
<b>Total Non-Conventional Pollutants</b>	<b>43,635.3</b>	<b>0.0</b>
<b>Total Pollutant Loadings *</b>	<b>994,561.4</b>	<b>0.0</b>

\* Sum Total of Conventional, Priority, and Non-Conventional Pollutants

<b>BAT/NSPS Option 1 Loadings</b>		<b>Model Well:</b>	<b>DWD</b>
			<b>Existing Sources</b>
Technology = Discharge Assuming 4.03% (wt) Retention on Discharged Cuttings and 0.2% (vol.) Crude Contamination			
Dry Cuttings Generated per Well (lbs) =			778,050
Whole Drilling Fluid Discharged per Well (bbl) =			180.5
Pollutant Name	Annual Pollutant Loadings (lbs.) per DWD Model SBF Well	Annual Pollutant Reductions (lbs.) per DWD Model SBF Well [BPT Load-Option Load]	Annual Pollutant Reductions (lbs.) per DWD Model OBF Well [BPT Load-Option Load]
<b>Conventional Pollutants</b>			
Total Oil as SBF Basefluid	34,296.1	67,061.8	(34,296.1)
Total Oil as Formation Oil	105.9	207.1	(105.9)
Total Oil (SBF Basefluid + Form. Oil)	34,402.0	67,268.9	(34,402.0)
TSS (associated with discharged SBF)	24,080.3	47,085.9	(24,080.3)
TSS (associated with dry cuttings)	778,050.0	0.0	(778,050.0)
TSS (total)	802,130.3	47,085.9	(802,130.3)
Total Conventional Pollutants (this value used in subsequent eng./nwqi/ea/econ. modeling)	836,532.3	114,354.8	(836,532.3)
<b>Priority Pollutant Organics</b>			
Naphthalene	0.1809	0.3537	(0.1809)
Fluorene	0.0987	0.1930	(0.0987)
Phenanthrene	0.2341	0.4576	(0.2341)
Phenol	0.0006	0.0012	(0.0006)
Total Organic Priority Pollutants	0.5143	1.0056	(0.5143)
<b>Priority Pollutants, Metals</b>			
Cadmium	0.0265	0.0518	(0.0265)
Mercury	0.0024	0.0047	(0.0024)
Antimony	0.1373	0.2684	(0.1373)
Arsenic	0.1710	0.3343	(0.1710)
Beryllium	0.0169	0.0330	(0.0169)
Chromium	5.7793	11.3006	(5.7793)
Copper	0.4503	0.8805	(0.4503)
Lead	0.8452	1.6527	(0.8452)
Nickel	0.3251	0.6357	(0.3251)
Selenium	0.0265	0.0518	(0.0265)
Silver	0.0169	0.0330	(0.0169)
Thallium	0.0289	0.0565	(0.0289)
Zinc	4.8281	9.4407	(4.8281)
Total Metals Priority Pollutants	12.6542	24.7437	(12.6542)
<b>BAT/NSPS Option 1 Loadings</b>		<b>Model Well:</b>	<b>DWD</b>
			<b>Existing Sources</b>
Technology = Discharge Assuming 4.03% (wt) Retention on Discharged Cuttings and 0.2% (vol.) Crude Contamination			
Pollutant Name	Annual Pollutant Loadings (lbs.) per DWD Model SBF Well	Annual Pollutant Reductions (lbs.) per DWD Model SBF Well [BPT Load-Option Load]	Annual Pollutant Reductions (lbs.) per DWD Model OBF Well [BPT Load-Option Load]
<b>Non-Conventional Pollutants</b>			
Aluminum	218.4055	427.0648	(218.4055)
Barium	14159.1918	27,686.5360	(14,159.1918)
Iron	369.4947	722.5009	(369.4947)
Tin	0.3516	0.6875	(0.3516)
Titanium	2.1070	4.1200	(2.1070)
Alkylated benzenes	1.0185	1.9914	(1.0185)
Alkylated naphthalenes	9.5756	18.7214	(9.5756)
Alkylated fluorenes	1.1527	2.2536	(1.1527)
Alkylated phenanthrenes	1.4563	2.8473	(1.4563)
Alkylated phenols	0.0056	0.0110	(0.0056)
Total biphenyls	1.8928	3.7007	(1.8928)
Total dibenzothiophenes	0.0807	0.1577	(0.0807)
Total Non-Conventional Pollutants	14,764.7	28,870.6	(14,764.7)
Total Pollutant Loadings *	851,310.2	143,251.2	(851,310.2)
* Sum Total of Conventional, Priority, and Non-Conventional Pollutants			

BAT/NSPS Option 2 Loadings		Model Well:		DWD Existing Sources	
Technology = Discharge Assuming 3.82% (wt) Retention on Discharged Cuttings and 0.2% (vol.) Crude Contamination					
Dry Cuttings Generated per Well (lbs) =		758,397			
Whole Drilling Fluid Discharged per Well (bbl) =		165.9			
Pollutant Name	Annual Pollutant Loadings (lbs.) per DWD Model SBF Well	Annual Pollutant Reductions (lbs.) per DWD Model SBF Well [BPT Load-Option Load]	Annual Pollutant Reductions (lbs.) per DWD Model OBF Well [BPT Load-Option Load]		
<b>Conventional Pollutants</b>					
Total Oil as SBF Basefluid	31,533.7	69,824.2	(31,533.7)		
Total Oil as Formation Oil	97.4	215.6	(97.4)		
Total Oil (SBF Basefluid + Form. Oil)	31,631.1	70,039.8	(31,631.1)		
TSS (associated with discharged SBF)	22,140.7	49,025.5	(22,140.7)		
TSS (associated with dry cuttings)	758,396.9	19,653.1	(758,396.9)		
TSS (total)	780,537.6	68,678.7	(780,537.6)		
Total Conventional Pollutants (this value used in subsequent eng./nwqi/ea/econ. modeling)	812,168.6	138,718.5	(812,168.6)		
<b>Priority Pollutant Organics</b>					
Naphthalene	0.1663	0.3684	(0.1663)		
Fluorene	0.0907	0.2009	(0.0907)		
Phenanthrene	0.2151	0.4766	(0.2151)		
Phenol	0.0006	0.0013	(0.0006)		
Total Organic Priority Pollutants	0.4727	1.0472	(0.4727)		
<b>Priority Pollutants, Metals</b>					
Cadmium	0.0244	0.0539	(0.0244)		
Mercury	0.0022	0.0049	(0.0022)		
Antimony	0.1262	0.2794	(0.1262)		
Arsenic	0.1572	0.3481	(0.1572)		
Beryllium	0.0155	0.0343	(0.0155)		
Chromium	5.3138	11.7661	(5.3138)		
Copper	0.4140	0.9168	(0.4140)		
Lead	0.7771	1.7208	(0.7771)		
Nickel	0.2989	0.6618	(0.2989)		
Selenium	0.0244	0.0539	(0.0244)		
Silver	0.0155	0.0343	(0.0155)		
Thallium	0.0266	0.0588	(0.0266)		
Zinc	4.4392	9.8296	(4.4392)		
Total Metals Priority Pollutants	11.6349	25.8	(11.6349)		
BAT/NSPS Option 2 Loadings		Model Well:		DWD Existing Sources	
Technology = Discharge Assuming 3.82% (wt) Retention on Discharged Cuttings and 0.2% (vol.) Crude Contamination					
Pollutant Name	Annual Pollutant Loadings (lbs.) per DWD Model SBF Well	Annual Pollutant Reductions (lbs.) per DWD Model SBF Well [BPT Load-Option Load]	Annual Pollutant Reductions (lbs.) per DWD Model OBF Well [BPT Load-Option Load]		
<b>Non-Conventional Pollutants</b>					
Aluminum	200.8139	444.6565	(200.8139)		
Barium	13018.7269	28,827.0009	(13,018.7269)		
Iron	339.7334	752.2622	(339.7334)		
Tin	0.3233	0.7158	(0.3233)		
Titanium	1.9373	4.2897	(1.9373)		
Alkylated benzenes	0.9362	2.0738	(0.9362)		
Alkylated naphthalenes	8.8010	19.4959	(8.8010)		
Alkylated fluorenes	1.0594	2.3468	(1.0594)		
Alkylated phenanthrenes	1.3385	2.9651	(1.3385)		
Alkylated phenols	0.0052	0.0114	(0.0052)		
Total biphenyls	1.7397	3.8538	(1.7397)		
Total dibenzothiophenes	0.0741	0.1642	(0.0741)		
Total Non-Conventional Pollutants	13575.5	30,059.8	(13,575.5)		
Total Pollutant Loadings *		825,756.2	168,805.1	(825,756.2)	
* Sum Total of Conventional, Priority, and Non-Conventional Pollutants					

<b>Zero Discharge Option</b>		<b>Model Well:</b>	<b>DWD</b>
			<b>Existing Sources</b>
Technology = Zero Discharge of All Cuttings Wastes (assuming 10.20% (wt) retention on zero discharged cuttings)			
Dry Cuttings Generated per Well (lbs) =		778,050	
Whole Drilling Fluid Discharged per Well (bbl) =		533.4	
Pollutant Name	Annual Pollutant Loadings (lbs.) per DWD Model SBF Well	Annual Pollutant Reductions (lbs.) per DWD Model SBF Well [BPT Load-Option Load]	Annual Pollutant Reductions (lbs.) per DWD Model OBF Well [BPT Load-Option Load]
<b>Conventional Pollutants</b>			
Total Oil as SBF Basefluid	0	101,357.9	0
Total Oil as Formation Oil	0	313.0	0
Total Oil (SBF Basefluid + Form. Oil)	0	101,670.9	0
TSS (associated with discharged SBF)	0	71,166.2	0
TSS (associated with dry cuttings)	0	778,050.0	0
TSS (total)	0	849,216.2	0
Total Conventional Pollutants (this value used in subsequent eng./nwqj/ea/econ. modeling)	0.0	950,887.1	0.0
<b>Priority Pollutant Organics</b>			
Naphthalene	0	0.5347	0
Fluorene	0	0.2916	0
Phenanthrene	0	0.6917	0
Phenol	0	0.0019	0
Total Organic Priority Pollutants	0.0	1.5199	0.0
<b>Priority Pollutants, Metals</b>			
Cadmium	0	0.0783	0
Mercury	0	0.0071	0
Antimony	0	0.4056	0
Arsenic	0	0.5053	0
Beryllium	0	0.0498	0
Chromium	0	17.0799	0
Copper	0	1.3308	0
Lead	0	2.4979	0
Nickel	0	0.9607	0
Selenium	0	0.0783	0
Silver	0	0.0498	0
Thallium	0	0.0854	0
Zinc	0	14.2688	0
Total Metals Priority Pollutants	0.0	37.4	0.0
<b>Zero Discharge Option</b>		<b>Model Well:</b>	<b>DWD</b>
			<b>Existing Sources</b>
Technology = Zero Discharge of All Cuttings Wastes (assuming 10.20% (wt) retention on zero discharged cuttings)			
Pollutant Name	Annual Pollutant Loadings (lbs.) per DWD Model SBF Well	Annual Pollutant Reductions (lbs.) per DWD Model SBF Well [BPT Load-Option Load]	Annual Pollutant Reductions (lbs.) per DWD Model OBF Well [BPT Load-Option Load]
<b>Non-Conventional Pollutants</b>			
Aluminum	0	645.4704	0
Barium	0	41,845.7278	0
Iron	0	1,091.9956	0
Tin	0	1.0390	0
Titanium	0	6.2270	0
Alkylated benzenes	0	3.0099	0
Alkylated naphthalenes	0	28.2970	0
Alkylated fluorenes	0	3.4063	0
Alkylated phenanthrenes	0	4.3036	0
Alkylated phenols	0	0.0166	0
Total biphenyls	0	5.5936	0
Total dibenzothiophenes	0	0.2384	0
Total Non-Conventional Pollutants	0.0	43,635.3	0.0
Total Pollutant Loadings *	0.0	994,561.4	0.0
* Sum Total of Conventional, Priority, and Non-Conventional Pollutants			

**WORKSHEET No. 2:**  
**Deep Water Exploratory Model Well**

**BPT Baseline Loadings                      Model Well:                      DWE                      Existing Sources**

Technology = Discharge Assuming 10.20% (wt) Retention on Discharged Cuttings and  
0.2% (vol.) Crude Contamination  
Dry Cuttings Generated per Well (lbs) = 1,729,910  
Whole Drilling Fluid Discharged per Well (bbl) = 1186

Pollutant Name	Annual Pollutant Loadings (lbs.) per DWE Model SBF Well	Annual Pollutant Loadings (lbs.) per DWE Model OBF Well
<b>Conventional Pollutants</b>		
Total Oil as SBF Basefluid	225,358.4	0
Total Oil as Formation Oil	695.9	0
Total Oil (SBF Basefluid + Form. Oil)	226,054.3	0
TSS (associated with discharged SBF)	158,230.4	0
TSS (associated with dry cuttings)	1,729,910.0	0
TSS (total)	1,888,140.4	0
<b>Total Conventional Pollutants (this value used in subsequent eng./nwqi/ea/econ. modeling)</b>	<b>2,114,194.6</b>	<b>0.0</b>
<b>Priority Pollutant Organics</b>		
Naphthalene	1.1887	0
Fluorene	0.6484	0
Phenanthrene	1.5379	0
Phenol	0.0042	0
<b>Total Organic Priority Pollutants</b>	<b>3.3792</b>	<b>0.0</b>
<b>Priority Pollutants, Metals</b>		
Cadmium	0.1741	0
Mercury	0.0158	0
Antimony	0.9019	0
Arsenic	1.1234	0
Beryllium	0.1108	0
Chromium	37.9753	0
Copper	2.9589	0
Lead	5.5539	0
Nickel	2.1361	0
Selenium	0.1741	0
Silver	0.1108	0
Thallium	0.1899	0
Zinc	31.7252	0
<b>Total Metals Priority Pollutants</b>	<b>83.1501</b>	<b>0.0</b>

**BPT Baseline Loadings                      Model Well:                      DWE                      Existing Sources**

Technology = Discharge Assuming 10.20% (wt) Retention on Discharged Cuttings and  
0.2% (vol.) Crude Contamination

Pollutant Name	Annual Pollutant Loadings (lbs.) per DWE Model SBF Well	Annual Pollutant Loadings (lbs.) per DWE Model OBF Well
<b>Non-Conventional Pollutants</b>		
Aluminum	1435.1335	0
Barium	93039.4487	0
Iron	2427.9340	0
Tin	2.3102	0
Titanium	13.8452	0
Alkylated benzenes	6.6919	0
Alkylated naphthalenes	62.9122	0
Alkylated fluorenes	7.5731	0
Alkylated phenanthrenes	9.5682	0
Alkylated phenols	0.0369	0
Total biphenyls	12.4361	0
Total dibenzothiophenes	0.5300	0
<b>Total Non-Conventional Pollutants</b>	<b>97,018.4</b>	<b>0.0</b>
<b>Total Pollutant Loadings *</b>	<b>2,211,299.6</b>	<b>0.0</b>

\* Sum Total of Conventional, Priority, and Non-Conventional Pollutants

<b>BAT/NSPS Option 1 Loadings</b>		<b>Model Well:</b>	<b>DWE</b>
			<b>Existing Sources</b>
Technology = Discharge Assuming 4.03% (wt) Retention on Discharged Cuttings and 0.2% (vol.) Crude Contamination			
Dry Cuttings Generated per Well (lbs) =			1,729,910
Whole Drilling Fluid Discharged per Well (bbl) =			401.3
Pollutant Name	Annual Pollutant Loadings (lbs.) per DWE Model SBF Well	Annual Pollutant Reductions (lbs.) per DWE Model SBF Well [BPT Load-Option Load]	Annual Pollutant Reductions (lbs.) per DWE Model OBF Well [BPT Load-Option Load]
<b>Conventional Pollutants</b>			
Total Oil as SBF Basefluid	76,253.7	149,104.7	(76,253.7)
Total Oil as Formation Oil	235.5	460.4	(235.5)
Total Oil (SBF Basefluid + Form. Oil)	76,489.2	149,565.1	(76,489.2)
TSS (associated with discharged SBF)	53,539.8	104,690.5	(53,539.8)
TSS (associated with dry cuttings)	1,729,910.0	0.0	(1,729,910.0)
TSS (total)	1,783,449.8	104,690.5	(1,783,449.8)
Total Conventional Pollutants (this value used in subsequent eng./nwqi/ea/econ. modeling)	1,859,939.0	254,255.6	(1,859,939.0)
<b>Priority Pollutant Organics</b>			
Naphthalene	0.4023	0.7865	(0.4023)
Fluorene	0.2194	0.4290	(0.2194)
Phenanthrene	0.5204	1.0175	(0.5204)
Phenol	0.0014	0.0028	(0.0014)
Total Organic Priority Pollutants	1.1435	2.2357	(1.1435)
<b>Priority Pollutants, Metals</b>			
Cadmium	0.0589	0.1152	(0.0589)
Mercury	0.0054	0.0105	(0.0054)
Antimony	0.3052	0.5967	(0.3052)
Arsenic	0.3801	0.7433	(0.3801)
Beryllium	0.0375	0.0733	(0.0375)
Chromium	12.8496	25.1257	(12.8496)
Copper	1.0012	1.9577	(1.0012)
Lead	1.8792	3.6746	(1.8792)
Nickel	0.7228	1.4133	(0.7228)
Selenium	0.0589	0.1152	(0.0589)
Silver	0.0375	0.0733	(0.0375)
Thallium	0.0642	0.1256	(0.0642)
Zinc	10.7347	20.9904	(10.7347)
Total Metals Priority Pollutants	28.1352	55.0149	(28.1352)
<b>BAT/NSPS Option 1 Loadings</b>		<b>Model Well:</b>	<b>DWE</b>
			<b>Existing Sources</b>
Technology = Discharge Assuming 4.03% (wt) Retention on Discharged Cuttings and 0.2% (vol.) Crude Contamination			
Pollutant Name	Annual Pollutant Loadings (lbs.) per DWE Model SBF Well	Annual Pollutant Reductions (lbs.) per DWE Model SBF Well [BPT Load-Option Load]	Annual Pollutant Reductions (lbs.) per DWE Model OBF Well [BPT Load-Option Load]
<b>Non-Conventional Pollutants</b>			
Aluminum	485.6011	949.5324	(485.6011)
Barium	31481.4312	61,558.0175	(31,481.4312)
Iron	821.5315	1,606.4025	(821.5315)
Tin	0.7817	1.5285	(0.7817)
Titanium	4.6847	9.1604	(4.6847)
Alkylated benzenes	2.2645	4.4274	(2.2645)
Alkylated naphthalenes	21.2890	41.6232	(21.2890)
Alkylated fluorenes	2.5627	5.0104	(2.5627)
Alkylated phenanthrenes	3.2378	6.3304	(3.2378)
Alkylated phenols	0.0125	0.0244	(0.0125)
Total biphenyls	4.2083	8.2278	(4.2083)
Total dibenzothiophenes	0.1793	0.3506	(0.1793)
Total Non-Conventional Pollutants	32,827.8	64,190.6	(32,827.8)
Total Pollutant Loadings *	1,892,796.1	318,503.5	(1,892,796.1)
* Sum Total of Conventional, Priority, and Non-Conventional Pollutants			

BAT/NSPS Option 2 Loadings      Model Well:      DWE Existing Sources			
Technology = Discharge Assuming 3.82% (wt) Retention on Discharged Cuttings and 0.2% (vol.) Crude Contamination			
Dry Cuttings Generated per Well (lbs) =		1,686,213	
Whole Drilling Fluid Discharged per Well (bbl) =		368.9	
Pollutant Name	Annual Pollutant Loadings (lbs.) per DWE Model SBF Well	Annual Pollutant Reductions (lbs.) per DWE Model SBF Well [BPT Load-Option Load]	Annual Pollutant Reductions (lbs.) per DWE Model OBF Well [BPT Load-Option Load]
<b>Conventional Pollutants</b>			
Total Oil as SBF Basefluid	70,111.8	155,246.6	(70,111.8)
Total Oil as Formation Oil	216.5	479.4	(216.5)
Total Oil (SBF Basefluid + Form. Oil)	70,328.3	155,726.0	(70,328.3)
TSS (associated with discharged SBF)	49,227.4	109,002.9	(49,227.4)
TSS (associated with dry cuttings)	1,686,213.4	43,696.6	(1,686,213.4)
TSS (total)	1,735,440.8	152,699.6	(1,735,440.8)
Total Conventional Pollutants (this value used in subsequent eng./nwqi/ea/econ. modeling)	1,805,769.1	308,425.5	(1,805,769.1)
<b>Priority Pollutant Organics</b>			
Naphthalene	0.3698	0.8190	(0.3698)
Fluorene	0.2017	0.4467	(0.2017)
Phenanthrene	0.4784	1.0595	(0.4784)
Phenol	0.0013	0.0029	(0.0013)
Total Organic Priority Pollutants	1.0512	2.3280	(1.0512)
<b>Priority Pollutants, Metals</b>			
Cadmium	0.0542	0.1199	(0.0542)
Mercury	0.0049	0.0109	(0.0049)
Antimony	0.2806	0.6213	(0.2806)
Arsenic	0.3495	0.7739	(0.3495)
Beryllium	0.0345	0.0763	(0.0345)
Chromium	11.8146	26.1607	(11.8146)
Copper	0.9206	2.0384	(0.9206)
Lead	1.7279	3.8260	(1.7279)
Nickel	0.6646	1.4715	(0.6646)
Selenium	0.0542	0.1199	(0.0542)
Silver	0.0345	0.0763	(0.0345)
Thallium	0.0591	0.1308	(0.0591)
Zinc	9.8701	21.8551	(9.8701)
Total Metals Priority Pollutants	25.8690	57.3	(25.8690)
BAT/NSPS Option 2 Loadings      Model Well:      DWE Existing Sources			
Technology = Discharge Assuming 3.82% (wt) Retention on Discharged Cuttings and 0.2% (vol.) Crude Contamination			
Pollutant Name	Annual Pollutant Loadings (lbs.) per DWE Model SBF Well	Annual Pollutant Reductions (lbs.) per DWE Model SBF Well [BPT Load-Option Load]	Annual Pollutant Reductions (lbs.) per DWE Model OBF Well [BPT Load-Option Load]
<b>Non-Conventional Pollutants</b>			
Aluminum	446.4879	988.6456	(446.4879)
Barium	28945.7308	64,093.7179	(28,945.7308)
Iron	755.3605	1,672.5735	(755.3605)
Tin	0.7187	1.5914	(0.7187)
Titanium	4.3074	9.5378	(4.3074)
Alkylated benzenes	2.0817	4.6102	(2.0817)
Alkylated naphthalenes	19.5702	43.3420	(19.5702)
Alkylated fluorenes	2.3558	5.2173	(2.3558)
Alkylated phenanthrenes	2.9764	6.5918	(2.9764)
Alkylated phenols	0.0115	0.0254	(0.0115)
Total biphenyls	3.8685	8.5676	(3.8685)
Total dibenzothiophenes	0.1649	0.3651	(0.1649)
Total Non-Conventional Pollutants	30183.6	66,834.8	(30,183.6)
Total Pollutant Loadings *	1,835,979.7	375,319.9	(1,835,979.7)
* Sum Total of Conventional, Priority, and Non-Conventional Pollutants			

<b>Zero Discharge Option</b>		<b>Model Well:</b>	<b>DWE</b>
			<b>Existing Sources</b>
Technology = Zero Discharge of All Cuttings Wastes (assuming 10.20% (wt) retention on zero discharged cuttings)			
Dry Cuttings Generated per Well (lbs) =		1,729,910	
Whole Drilling Fluid Discharged per Well (bbl) =		1185.9	
Pollutant Name	Annual Pollutant Loadings (lbs.) per DWE Model SBF Well	Annual Pollutant Reductions (lbs.) per DWE Model SBF Well [BPT Load-Option Load]	Annual Pollutant Reductions (lbs.) per DWE Model OBF Well [BPT Load-Option Load]
<b>Conventional Pollutants</b>			
Total Oil as SBF Basefluid	0	225,358.4	0
Total Oil as Formation Oil	0	695.9	0
Total Oil (SBF Basefluid + Form. Oil)	0	226,054.3	0
TSS (associated with discharged SBF)	0	158,230.4	0
TSS (associated with dry cuttings)	0	1,729,910.0	0
TSS (total)	0	1,888,140.4	0
Total Conventional Pollutants (this value used in subsequent eng./nwqj/ea/econ. modeling)	0.0	2,114,194.6	0.0
<b>Priority Pollutant Organics</b>			
Naphthalene	0	1.1887	0
Fluorene	0	0.6484	0
Phenanthrene	0	1.5379	0
Phenol	0	0.0042	0
Total Organic Priority Pollutants	0.0	3.3792	0.0
<b>Priority Pollutants, Metals</b>			
Cadmium	0	0.1741	0
Mercury	0	0.0158	0
Antimony	0	0.9019	0
Arsenic	0	1.1234	0
Beryllium	0	0.1108	0
Chromium	0	37.9753	0
Copper	0	2.9589	0
Lead	0	5.5539	0
Nickel	0	2.1361	0
Selenium	0	0.1741	0
Silver	0	0.1108	0
Thallium	0	0.1899	0
Zinc	0	31.7252	0
Total Metals Priority Pollutants	0.0	83.2	0.0
<b>Zero Discharge Option</b>		<b>Model Well:</b>	<b>DWE</b>
			<b>Existing Sources</b>
Technology = Zero Discharge of All Cuttings Wastes (assuming 10.20% (wt) retention on zero discharged cuttings)			
Pollutant Name	Annual Pollutant Loadings (lbs.) per DWE Model SBF Well	Annual Pollutant Reductions (lbs.) per DWE Model SBF Well [BPT Load-Option Load]	Annual Pollutant Reductions (lbs.) per DWE Model OBF Well [BPT Load-Option Load]
<b>Non-Conventional Pollutants</b>			
Aluminum	0	1,435.1335	0
Barium	0	93,039.4487	0
Iron	0	2,427.9340	0
Tin	0	2.3102	0
Titanium	0	13.8452	0
Alkylated benzenes	0	6.6919	0
Alkylated naphthalenes	0	62.9122	0
Alkylated fluorenes	0	7.5731	0
Alkylated phenanthrenes	0	9.5682	0
Alkylated phenols	0	0.0369	0
Total biphenyls	0	12.4361	0
Total dibenzothiophenes	0	0.5300	0
Total Non-Conventional Pollutants	0.0	97,018.4	0.0
Total Pollutant Loadings *	0.0	2,211,299.6	0.0
* Sum Total of Conventional, Priority, and Non-Conventional Pollutants			



**WORKSHEET No. 3:**  
**Shallow Water Development Model Well**

**BPT Baseline Loadings                      Model Well:                      SWD                      Existing Sources**

Technology = Discharge Assuming 10.20% (wt) Retention on Discharged Cuttings and  
0.2% (vol.) Crude Contamination  
Dry Cuttings Generated per Well (lbs) = 514,150  
Whole Drilling Fluid Discharged per Well (bbl) = 353

Pollutant Name	Annual Pollutant Loadings (lbs.) per SWD Model SBF Well	Annual Pollutant Loadings (lbs.) per SWD Model OBF Well
<b>Conventional Pollutants</b>		
Total Oil as SBF Basefluid	66,979.2	0.0
Total Oil as Formation Oil	206.8	0.0
Total Oil (SBF Basefluid + Form. Oil)	67,186.0	0.0
TSS (associated with discharged SBF)	47,028.0	0.0
TSS (associated with dry cuttings)	514,150.0	0.0
TSS (total)	561,178.0	0.0
<b>Total Conventional Pollutants (this value used in subsequent eng./nwgi/ea/econ. modeling)</b>	<b>628,364.0</b>	<b>0.0</b>
<b>Priority Pollutant Organics</b>		
Naphthalene	0.3533	0.0
Fluorene	0.1927	0.0
Phenanthrene	0.4571	0.0
Phenol	0.0012	0.0
<b>Total Organic Priority Pollutants</b>	<b>1.0045</b>	<b>0.0</b>
<b>Priority Pollutants, Metals</b>		
Cadmium	0.0517	0.0
Mercury	0.0047	0.0
Antimony	0.2681	0.0
Arsenic	0.3339	0.0
Beryllium	0.0329	0.0
Chromium	11.2867	0.0
Copper	0.8794	0.0
Lead	1.6507	0.0
Nickel	0.6349	0.0
Selenium	0.0517	0.0
Silver	0.0329	0.0
Thallium	0.0564	0.0
Zinc	9.4291	0.0
<b>Total Metals Priority Pollutants</b>	<b>24.71</b>	<b>0.0</b>

**BPT Baseline Loadings                      Model Well:                      SWD                      Existing Sources**

Technology = Discharge Assuming 10.20% (wt) Retention on Discharged Cuttings and  
0.2% (vol.) Crude Contamination

Pollutant Name	Annual Pollutant Loadings (lbs.) per SWD Model SBF Well	Annual Pollutant Loadings (lbs.) per SWD Model OBF Well
<b>Non-Conventional Pollutants</b>		
Aluminum	426.5	0.0
Barium	27,652	0.0
Iron	721.6	0.0
Tin	0.6866	0.0
Titanium	4.1149	0.0
Alkylated benzenes	1.9891	0.0
Alkylated naphthalenes	18.7002	0.0
Alkylated fluorenes	2.2510	0.0
Alkylated phenanthrenes	2.8441	0.0
Alkylated phenols	0.0110	0.0
Total biphenyls	3.6965	0.0
Total dibenzothiophenes	0.1575	0.0
<b>Total Non-Conventional Pollutants</b>	<b>28,835</b>	<b>0.0</b>
<b>Total Pollutant Loadings *</b>	<b>628,364</b>	<b>0.0</b>

\* Sum Total of Conventional, Priority, and Non-Conventional Pollutants

BAT/NSPS Option 1 Loadings		Model Well: SWD Existing Sources	
Technology = Discharge Assuming 4.03% (wt) Retention on Discharged Cuttings and 0.2% (vol.) Crude Contamination		514,150 119.3	
Dry Cuttings Generated per Well (lbs) =			
Whole Drilling Fluid Discharged per Well (bbl) =			
Pollutant Name	Annual Pollutant Loadings (lbs.) per SWD Model SBF Well	Annual Pollutant Reductions (lbs.) per SWD Model SBF Well [BPT Load-Option Load]	Annual Pollutant Reductions (lbs.) per SWD Model OBF Well [BPT Load-Option Load]
<b>Conventional Pollutants</b>			
Total Oil as SBF Basefluid	22,663.5	44,315.7	(22,663.5)
Total Oil as Formation Oil	70.0	136.8	(70.0)
Total Oil (SBF Basefluid + Form. Oil)	22,733.5	44,452.5	(22,733.5)
TSS (associated with discharged SBF)	15,912.7	31,115.3	(15,912.7)
TSS (associated with dry cuttings)	514,150.0	0.0	(514,150.0)
TSS (total)	530,062.7	31,115.3	(530,062.7)
Total Conventional Pollutants (this value used in subsequent eng./nwqi/ea/econ. modeling)	552,796.2	75,567.8	(552,796.2)
<b>Priority Pollutant Organics</b>			
Naphthalene	0.1196	0.2338	(0.1196)
Fluorene	0.0652	0.1275	(0.0652)
Phenanthrene	0.1547	0.3024	(0.1547)
Phenol	0.0004	0.0008	(0.0004)
Total Organic Priority Pollutants	0.3399	0.6645	(0.3399)
<b>Priority Pollutants, Metals</b>			
Cadmium	0.0175	0.0342	(0.0175)
Mercury	0.0016	0.0031	(0.0016)
Antimony	0.0907	0.1774	(0.0907)
Arsenic	0.1130	0.2209	(0.1130)
Beryllium	0.0111	0.0218	(0.0111)
Chromium	3.8190	7.4677	(3.8190)
Copper	0.2976	0.5819	(0.2976)
Lead	0.5585	1.0921	(0.5585)
Nickel	0.2148	0.4201	(0.2148)
Selenium	0.0175	0.0342	(0.0175)
Silver	0.0111	0.0218	(0.0111)
Thallium	0.0191	0.0373	(0.0191)
Zinc	3.1905	6.2386	(3.1905)
Total Metals Priority Pollutants	8.3621	16.3511	(8.3621)
BAT/NSPS Option 1 Loadings		Model Well: SWD Existing Sources	
Technology = Discharge Assuming 4.03% (wt) Retention on Discharged Cuttings and 0.2% (vol.) Crude Contamination			
Pollutant Name	Annual Pollutant Loadings (lbs.) per SWD Model SBF Well	Annual Pollutant Reductions (lbs.) per SWD Model SBF Well [BPT Load-Option Load]	Annual Pollutant Reductions (lbs.) per SWD Model OBF Well [BPT Load-Option Load]
<b>Non-Conventional Pollutants</b>			
Aluminum	144.3265	282.2124	(144.3265)
Barium	9356.6589	18,295.7811	(9,356.6589)
Iron	244.1690	477.4421	(244.1690)
Tin	0.2323	0.4543	(0.2323)
Titanium	1.3924	2.7226	(1.3924)
Alkylated benzenes	0.6732	1.3159	(0.6732)
Alkylated naphthalenes	6.3289	12.3713	(6.3289)
Alkylated fluorenes	0.7618	1.4892	(0.7618)
Alkylated phenanthrenes	0.9625	1.8815	(0.9625)
Alkylated phenols	0.0037	0.0073	(0.0037)
Total biphenyls	1.2511	2.4455	(1.2511)
Total dibenzothiophenes	0.0533	0.1042	(0.0533)
Total Non-Conventional Pollutants	9,756.8	19,078.2	(9,756.8)
Total Pollutant Loadings *	552,796.2	94,663.1	(562,561.7)
* Sum Total of Conventional, Priority, and Non-Conventional Pollutants			

BAT/NSPS Option 2 Loadings		Model Well:	SWD Existing Sources	
Technology = Discharge Assuming 3.82% (wt) Retention on Discharged Cuttings and 0.2% (vol.) Crude Contamination				
Dry Cuttings Generated per Well (lbs) =		501,163		
Whole Drilling Fluid Discharged per Well (bbl) =		109.7		
Pollutant Name	Annual Pollutant Loadings (lbs.) per SWD Model SBF Well	Annual Pollutant Reductions (lbs.) per SWD Model SBF Well [BPT Load-Option Load]	Annual Pollutant Reductions (lbs.) per SWD Model OBF Well [BPT Load-Option Load]	
Conventional Pollutants				
Total Oil as SBF Basefluid	20,838.1	46,141.1	(20,838.1)	
Total Oil as Formation Oil	64.3	142.5	(64.3)	
Total Oil (SBF Basefluid + Form. Oil)	20,902.4	46,283.6	(20,902.4)	
TSS (associated with discharged SBF)	14,631.0	32,397.0	(14,631.0)	
TSS (associated with dry cuttings)	501,162.8	12,987.2	(501,162.8)	
TSS (total)	515,793.8	45,384.1	(515,793.8)	
Total Conventional Pollutants (this value used in subsequent eng./nwqi/ea/econ. modeling)	536,696.2	91,667.8	(536,696.2)	
Priority Pollutant Organics				
Naphthalene	0.1100	0.2434	(0.1100)	
Fluorene	0.0600	0.1328	(0.0600)	
Phenanthrene	0.1423	0.3149	(0.1423)	
Phenol	0.0004	0.0009	(0.0004)	
Total Organic Priority Pollutants	0.3126	0.6919	(0.3126)	
Priority Pollutants, Metals				
Cadmium	0.0161	0.0356	(0.0161)	
Mercury	0.0015	0.0032	(0.0015)	
Antimony	0.0834	0.1847	(0.0834)	
Arsenic	0.1039	0.2300	(0.1039)	
Beryllium	0.0102	0.0227	(0.0102)	
Chromium	3.5114	7.7753	(3.5114)	
Copper	0.2736	0.6058	(0.2736)	
Lead	0.5135	1.1371	(0.5135)	
Nickel	0.1975	0.4374	(0.1975)	
Selenium	0.0161	0.0356	(0.0161)	
Silver	0.0102	0.0227	(0.0102)	
Thallium	0.0176	0.0389	(0.0176)	
Zinc	2.9335	6.4956	(2.9335)	
Total Metals Priority Pollutants	7.6886	17.0	(7.6886)	
BAT/NSPS Option 2 Loadings		Model Well:	SWD Existing Sources	
Technology = Discharge Assuming 3.82% (wt) Retention on Discharged Cuttings and 0.2% (vol.) Crude Contamination				
Pollutant Name	Annual Pollutant Loadings (lbs.) per SWD Model SBF Well	Annual Pollutant Reductions (lbs.) per SWD Model SBF Well [BPT Load-Option Load]	Annual Pollutant Reductions (lbs.) per SWD Model OBF Well [BPT Load-Option Load]	
Non-Conventional Pollutants				
Aluminum	132.7016	293.8373	(132.7016)	
Barium	8603.0184	19,049.4217	(8,603.0184)	
Iron	224.5022	497.1089	(224.5022)	
Tin	0.2136	0.4730	(0.2136)	
Titanium	1.2802	2.8347	(1.2802)	
Alkylated benzenes	0.6190	1.3701	(0.6190)	
Alkylated naphthalenes	5.8196	12.8806	(5.8196)	
Alkylated fluorenes	0.7005	1.5505	(0.7005)	
Alkylated phenanthrenes	0.8851	1.9590	(0.8851)	
Alkylated phenols	0.0034	0.0076	(0.0034)	
Total biphenyls	1.1504	2.5462	(1.1504)	
Total dibenzothiophenes	0.0490	0.1085	(0.0490)	
Total Non-Conventional Pollutants	8970.9	19,864.1	(8,970.9)	
Total Pollutant Loadings *		545,675.2	111,549.6	(545,675.2)
* Sum Total of Conventional, Priority, and Non-Conventional Pollutants				

<b>Zero Discharge Option</b>		<b>Model Well:</b>	<b>SWD</b>
			<b>Existing Sources</b>
Technology = Zero Discharge of All Cuttings Wastes (assuming 10.20% (wt) retention on zero discharged cuttings)			
Dry Cuttings Generated per Well (lbs) =		514,150	
Whole Drilling Fluid Discharged per Well (bbl) =		352.5	
Pollutant Name	Annual Pollutant Loadings (lbs.) per SWD Model SBF Well	Annual Pollutant Reductions (lbs.) per SWD Model SBF Well [BPT Load-Option Load]	Annual Pollutant Reductions (lbs.) per SWD Model OBF Well [BPT Load-Option Load]
<b>Conventional Pollutants</b>			
Total Oil as SBF Basefluid	0	66,979.2	0
Total Oil as Formation Oil	0	206.8	0
Total Oil (SBF Basefluid + Form. Oil)	0	67,186.0	0
TSS (associated with discharged SBF)	0	47,028.0	0
TSS (associated with dry cuttings)	0	514,150.0	0
TSS (total)	0	561,178.0	0
Total Conventional Pollutants (this value used in subsequent eng./nwqi/ea/econ. modeling)	0.0	628,364.0	0.0
<b>Priority Pollutant Organics</b>			
Naphthalene	0	0.3533	0
Fluorene	0	0.1927	0
Phenanthrene	0	0.4571	0
Phenol	0	0.0012	0
Total Organic Priority Pollutants	0.0	1.0045	0.0
<b>Priority Pollutants, Metals</b>			
Cadmium	0	0.0517	0
Mercury	0	0.0047	0
Antimony	0	0.2681	0
Arsenic	0	0.3339	0
Beryllium	0	0.0329	0
Chromium	0	11.2867	0
Copper	0	0.8794	0
Lead	0	1.6507	0
Nickel	0	0.6349	0
Selenium	0	0.0517	0
Silver	0	0.0329	0
Thallium	0	0.0564	0
Zinc	0	9.4291	0
Total Metals Priority Pollutants	0.0	24.7	0.0
<b>Zero Discharge Option</b>		<b>Model Well:</b>	<b>SWD</b>
			<b>Existing Sources</b>
Technology = Zero Discharge of All Cuttings Wastes (assuming 10.20% (wt) retention on zero discharged cuttings)			
Pollutant Name	Annual Pollutant Loadings (lbs.) per SWD Model SBF Well	Annual Pollutant Reductions (lbs.) per SWD Model SBF Well [BPT Load-Option Load]	Annual Pollutant Reductions (lbs.) per SWD Model OBF Well [BPT Load-Option Load]
<b>Non-Conventional Pollutants</b>			
Aluminum	0	426.5389	0
Barium	0	27,652.4400	0
Iron	0	721.6111	0
Tin	0	0.6866	0
Titanium	0	4.1149	0
Alkylated benzenes	0	1.9891	0
Alkylated naphthalenes	0	18.7002	0
Alkylated fluorenes	0	2.2510	0
Alkylated phenanthrenes	0	2.8441	0
Alkylated phenols	0	0.0110	0
Total biphenyls	0	3.6965	0
Total dibenzothiophenes	0	0.1575	0
Total Non-Conventional Pollutants	0.0	28,835.0	0.0
Total Pollutant Loadings *	0.0	657,224.8	0.0
* Sum Total of Conventional, Priority, and Non-Conventional Pollutants			

**WORKSHEET No. 4:**  
**Shallow Water Exploratory Model Well**

**BPT Baseline Loadings                      Model Well:                      SWE                      Existing Sources**

Technology = Discharge Assuming 10.20% (wt) Retention on Discharged Cuttings and  
0.2% (vol.) Crude Contamination  
Dry Cuttings Generated per Well (lbs) = 1,077,440  
Whole Drilling Fluid Discharged per Well (bbl) = 739

Pollutant Name	Annual Pollutant Loadings (lbs.) per SWE Model SBF Well	Annual Pollutant Loadings (lbs.) per SWE Model OBF Well
<b>Conventional Pollutants</b>		
Total Oil as SBF Basefluid	140,360.0	0
Total Oil as Formation Oil	433.4	0
Total Oil (SBF Basefluid + Form. Oil)	140,793.4	0
TSS (associated with discharged SBF)	98,550.6	0
TSS (associated with dry cuttings)	1,077,440.0	0
TSS (total)	1,175,990.6	0
<b>Total Conventional Pollutants (this value used in subsequent eng./nwqi/ea/econ. modeling)</b>	<b>1,316,784.0</b>	<b>0.0</b>
<b>Priority Pollutant Organics</b>		
Naphthalene	0.7404	0
Fluorene	0.4038	0
Phenanthrene	0.9578	0
Phenol	0.0026	0
<b>Total Organic Priority Pollutants</b>	<b>2.1046</b>	<b>0.0</b>
<b>Priority Pollutants, Metals</b>		
Cadmium	0.1084	0
Mercury	0.0099	0
Antimony	0.5617	0
Arsenic	0.6997	0
Beryllium	0.0690	0
Chromium	23.6522	0
Copper	1.8429	0
Lead	3.4591	0
Nickel	1.3304	0
Selenium	0.1084	0
Silver	0.0690	0
Thallium	0.1183	0
Zinc	19.7594	0
<b>Total Metals Priority Pollutants</b>	<b>51.7884</b>	<b>0.0</b>

**BPT Baseline Loadings                      Model Well:                      SWE                      Existing Sources**

Technology = Discharge Assuming 10.20% (wt) Retention on Discharged Cuttings and  
0.2% (vol.) Crude Contamination

Pollutant Name	Annual Pollutant Loadings (lbs.) per SWE Model SBF Well	Annual Pollutant Loadings (lbs.) per SWE Model OBF Well
<b>Non-Conventional Pollutants</b>		
Aluminum	893.8443	0
Barium	57947.7681	0
Iron	1512.1904	0
Tin	1.4388	0
Titanium	8.6232	0
Alkylated benzenes	4.1678	0
Alkylated naphthalenes	39.1829	0
Alkylated fluorenes	4.7166	0
Alkylated phenanthrenes	5.9592	0
Alkylated phenols	0.0230	0
Total biphenyls	7.7454	0
Total dibenzothiophenes	0.3301	0
<b>Total Non-Conventional Pollutants</b>	<b>60,426.0</b>	<b>0.0</b>
<b>Total Pollutant Loadings *</b>	<b>1,377,263.9</b>	<b>0.0</b>

\* Sum Total of Conventional, Priority, and Non-Conventional Pollutants

<b>BAT/NSPS Option 1 Loadings</b>		<b>Model Well:</b>	<b>SWE</b>
			<b>Existing Sources</b>
Technology = Discharge Assuming 4.03% (wt) Retention on Discharged Cuttings and 0.2% (vol.) Crude Contamination			
Dry Cuttings Generated per Well (lbs) =			1,077,440
Whole Drilling Fluid Discharged per Well (bbl) =			249.9
Pollutant Name	Annual Pollutant Loadings (lbs.) per SWE Model SBF Well	Annual Pollutant Reductions (lbs.) per SWE Model SBF Well [BPT Load-Option Load]	Annual Pollutant Reductions (lbs.) per SWE Model OBF Well [BPT Load-Option Load]
<b>Conventional Pollutants</b>			
Total Oil as SBF Basefluid	47,493.1	92,866.9	(47,493.1)
Total Oil as Formation Oil	146.7	286.8	(146.7)
Total Oil (SBF Basefluid + Form. Oil)	47,639.8	93,153.6	(47,639.8)
TSS (associated with discharged SBF)	33,346.2	65,204.4	(33,346.2)
TSS (associated with dry cuttings)	1,077,440.0	0.0	(1,077,440.0)
TSS (total)	1,110,786.2	65,204.4	(1,110,786.2)
Total Conventional Pollutants (this value used in subsequent eng./nwqi/ea/econ. modeling)	1,158,426.0	158,358.0	(1,158,426.0)
<b>Priority Pollutant Organics</b>			
Naphthalene	0.2505	0.4899	(0.2505)
Fluorene	0.1366	0.2672	(0.1366)
Phenanthrene	0.3241	0.6338	(0.3241)
Phenol	0.0009	0.0017	(0.0009)
Total Organic Priority Pollutants	0.7121	1.3926	(0.7121)
<b>Priority Pollutants, Metals</b>			
Cadmium	0.0367	0.0717	(0.0367)
Mercury	0.0033	0.0065	(0.0033)
Antimony	0.1901	0.3717	(0.1901)
Arsenic	0.2368	0.4630	(0.2368)
Beryllium	0.0233	0.0456	(0.0233)
Chromium	8.0031	15.6491	(8.0031)
Copper	0.6236	1.2193	(0.6236)
Lead	1.1705	2.2887	(1.1705)
Nickel	0.4502	0.8803	(0.4502)
Selenium	0.0367	0.0717	(0.0367)
Silver	0.0233	0.0456	(0.0233)
Thallium	0.0400	0.0782	(0.0400)
Zinc	6.6859	13.0735	(6.6859)
Total Metals Priority Pollutants	17.5234	34.2649	(17.5234)
<b>BAT/NSPS Option 1 Loadings</b>		<b>Model Well:</b>	<b>SWE</b>
			<b>Existing Sources</b>
Technology = Discharge Assuming 4.03% (wt) Retention on Discharged Cuttings and 0.2% (vol.) Crude Contamination			
Pollutant Name	Annual Pollutant Loadings (lbs.) per SWE Model SBF Well	Annual Pollutant Reductions (lbs.) per SWE Model SBF Well [BPT Load-Option Load]	Annual Pollutant Reductions (lbs.) per SWE Model OBF Well [BPT Load-Option Load]
<b>Non-Conventional Pollutants</b>			
Aluminum	302.4470	591.3974	(302.4470)
Barium	19607.5826	38,340.1855	(19,607.5826)
Iron	511.6745	1,000.5158	(511.6745)
Tin	0.4869	0.9520	(0.4869)
Titanium	2.9178	5.7054	(2.9178)
Alkylated benzenes	1.4102	2.7577	(1.4102)
Alkylated naphthalenes	13.2572	25.9256	(13.2572)
Alkylated fluorenes	1.5958	3.1208	(1.5958)
Alkylated phenanthrenes	2.0163	3.9430	(2.0163)
Alkylated phenols	0.0078	0.0152	(0.0078)
Total biphenyls	2.6206	5.1248	(2.6206)
Total dibenzothiophenes	0.1117	0.2184	(0.1117)
Total Non-Conventional Pollutants	20,446.1	39,979.9	(20,446.1)
Total Pollutant Loadings *	1,178,890.4	198,373.6	(1,178,890.4)
* Sum Total of Conventional, Priority, and Non-Conventional Pollutants			

BAT/NSPS Option 2 Loadings		Model Well:	SWE Existing Sources
Technology = Discharge Assuming 3.82% (wt) Retention on Discharged Cuttings and 0.2% (vol.) Crude Contamination			
Dry Cuttings Generated per Well (lbs) =		1,050,224	
Whole Drilling Fluid Discharged per Well (bbl) =		229.8	
Pollutant Name	Annual Pollutant Loadings (lbs.) per SWE Model SBF Well	Annual Pollutant Reductions (lbs.) per SWE Model SBF Well [BPT Load-Option Load]	Annual Pollutant Reductions (lbs.) per SWE Model OBF Well [BPT Load-Option Load]
<b>Conventional Pollutants</b>			
Total Oil as SBF Basefluid	43,667.7	96,692.2	(43,667.7)
Total Oil as Formation Oil	134.8	298.6	(134.8)
Total Oil (SBF Basefluid + Form. Oil)	43,802.6	96,990.8	(43,802.6)
TSS (associated with discharged SBF)	30,660.3	67,890.3	(30,660.3)
TSS (associated with dry cuttings)	1,050,224.4	27,215.6	(1,050,224.4)
TSS (total)	1,080,884.7	95,105.9	(1,080,884.7)
Total Conventional Pollutants (this value used in subsequent eng./nwqi/ea/econ. modeling)	1,124,687.3	192,096.7	(1,124,687.3)
<b>Priority Pollutant Organics</b>			
Naphthalene	0.2304	0.5100	(0.2304)
Fluorene	0.1256	0.2782	(0.1256)
Phenanthrene	0.2980	0.6598	(0.2980)
Phenol	0.0008	0.0018	(0.0008)
Total Organic Priority Pollutants	0.6548	1.4498	(0.6548)
<b>Priority Pollutants, Metals</b>			
Cadmium	0.0337	0.0747	(0.0337)
Mercury	0.0031	0.0068	(0.0031)
Antimony	0.1748	0.3870	(0.1748)
Arsenic	0.2177	0.4820	(0.2177)
Beryllium	0.0215	0.0475	(0.0215)
Chromium	7.3585	16.2937	(7.3585)
Copper	0.5733	1.2695	(0.5733)
Lead	1.0762	2.3829	(1.0762)
Nickel	0.4139	0.9165	(0.4139)
Selenium	0.0337	0.0747	(0.0337)
Silver	0.0215	0.0475	(0.0215)
Thallium	0.0368	0.0815	(0.0368)
Zinc	6.1474	13.6120	(6.1474)
Total Metals Priority Pollutants	16.1120	35.7	(16.1120)
BAT/NSPS Option 2 Loadings		Model Well:	SWE Existing Sources
Technology = Discharge Assuming 3.82% (wt) Retention on Discharged Cuttings and 0.2% (vol.) Crude Contamination			
Pollutant Name	Annual Pollutant Loadings (lbs.) per SWE Model SBF Well	Annual Pollutant Reductions (lbs.) per SWE Model SBF Well [BPT Load-Option Load]	Annual Pollutant Reductions (lbs.) per SWE Model OBF Well [BPT Load-Option Load]
<b>Non-Conventional Pollutants</b>			
Aluminum	278.0861	615.7582	(278.0861)
Barium	18028.2721	39,919.4960	(18,028.2721)
Iron	470.4613	1,041.7291	(470.4613)
Tin	0.4476	0.9912	(0.4476)
Titanium	2.6828	5.9404	(2.6828)
Alkylated benzenes	1.2967	2.8711	(1.2967)
Alkylated naphthalenes	12.1909	26.9919	(12.1909)
Alkylated fluorenes	1.4675	3.2492	(1.4675)
Alkylated phenanthrenes	1.8541	4.1051	(1.8541)
Alkylated phenols	0.0071	0.0158	(0.0071)
Total biphenyls	2.4098	5.3356	(2.4098)
Total dibenzothiophenes	0.1027	0.2274	(0.1027)
Total Non-Conventional Pollutants	18799.3	41,626.7	(18,799.3)
Total Pollutant Loadings *	1,143,503.4	233,760.5	(1,143,503.4)
* Sum Total of Conventional, Priority, and Non-Conventional Pollutants			

<b>Zero Discharge Option</b>		<b>Model Well:</b>	<b>SWE</b>
			<b>Existing Sources</b>
Technology = Zero Discharge of All Cuttings Wastes (assuming 10.20% (wt) retention on zero discharged cuttings)			
Dry Cuttings Generated per Well (lbs) =		1,077,440	
Whole Drilling Fluid Discharged per Well (bbl) =		738.6	
Pollutant Name	Annual Pollutant Loadings (lbs.) per SWE Model SBF Well	Annual Pollutant Reductions (lbs.) per SWE Model SBF Well [BPT Load-Option Load]	Annual Pollutant Reductions (lbs.) per SWE Model OBF Well [BPT Load-Option Load]
<b>Conventional Pollutants</b>			
Total Oil as SBF Basefluid	0	140,360.0	0
Total Oil as Formation Oil	0	433.4	0
Total Oil (SBF Basefluid + Form. Oil)	0	140,793.4	0
TSS (associated with discharged SBF)	0	98,550.6	0
TSS (associated with dry cuttings)	0	1,077,440.0	0
TSS (total)	0	1,175,990.6	0
Total Conventional Pollutants (this value used in subsequent eng./nwqj/ea/econ. modeling)	0.0	1,316,784.0	0.0
<b>Priority Pollutant Organics</b>			
Naphthalene	0	0.7404	0
Fluorene	0	0.4038	0
Phenanthrene	0	0.9578	0
Phenol	0	0.0026	0
Total Organic Priority Pollutants	0.0	2.1046	0.0
<b>Priority Pollutants, Metals</b>			
Cadmium	0	0.1084	0
Mercury	0	0.0099	0
Antimony	0	0.5617	0
Arsenic	0	0.6997	0
Beryllium	0	0.0690	0
Chromium	0	23.6522	0
Copper	0	1.8429	0
Lead	0	3.4591	0
Nickel	0	1.3304	0
Selenium	0	0.1084	0
Silver	0	0.0690	0
Thallium	0	0.1183	0
Zinc	0	19.7594	0
Total Metals Priority Pollutants	0.0	51.8	0.0
<b>Zero Discharge Option</b>		<b>Model Well:</b>	<b>SWE</b>
			<b>Existing Sources</b>
Technology = Zero Discharge of All Cuttings Wastes (assuming 10.20% (wt) retention on zero discharged cuttings)			
Pollutant Name	Annual Pollutant Loadings (lbs.) per SWE Model SBF Well	Annual Pollutant Reductions (lbs.) per SWE Model SBF Well [BPT Load-Option Load]	Annual Pollutant Reductions (lbs.) per SWE Model OBF Well [BPT Load-Option Load]
<b>Non-Conventional Pollutants</b>			
Aluminum	0	893.8443	0
Barium	0	57,947.7681	0
Iron	0	1,512.1904	0
Tin	0	1.4388	0
Titanium	0	8.6232	0
Alkylated benzenes	0	4.1678	0
Alkylated naphthalenes	0	39.1829	0
Alkylated fluorenes	0	4.7166	0
Alkylated phenanthrenes	0	5.9592	0
Alkylated phenols	0	0.0230	0
Total biphenyls	0	7.7454	0
Total dibenzothiophenes	0	0.3301	0
Total Non-Conventional Pollutants	0.0	60,426.0	0.0
Total Pollutant Loadings *	0.0	1,377,263.9	0.0
* Sum Total of Conventional, Priority, and Non-Conventional Pollutants			



**WORKSHEET 5:**
**Gulf of Mexico: Zero Discharge Summary, Existing Sources**

Baseline: Zero Discharge					
	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total
	Development	Exploratory	Development	Exploratory	
<b>No. wells, SBF</b>	86	51	16	48	201
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Discharge	54,039,305	67,155,986	15,214,194	101,481,343	237,890,828
Total Loadings, Zero Discharge	0	0	0	0	0
Onsite Injection (20%S: 0%D)	0	0	0	0	0
Onshore Disposal (80%S:100%D)	0	0	0	0	0
<b>No. wells, OBF</b>	42	25	0	0	67
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Zero Discharge	26,391,288	32,919,601	0	0	59,310,889
Onsite Injection (20%S: 0%D)	5,278,258	6,583,920	0	0	11,862,178
Onshore Disposal (80%S:100%D)	21,113,031	26,335,681	0	0	47,448,711
Total Toxic Organics Discharge	86	51	16	48	202
Total Toxic Metals Discharge	2,125	1,260	395	1,186	4,967
Total Toxics Discharge	2,212	1,312	411	1,234	5,169
Total Non-conventionals Discharge	2,479,814	1,470,587	461,361	1,384,082	5,795,843
BAT 1: Zero Discharge					
	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total
	Development	Exploratory	Development	Exploratory	
<b>No. wells, SBF</b>	124	74	17	49	264
Loadings/well (lbs)	552,796	1,158,426	836,532	1,859,939	
Total Loadings, Discharge	68,546,728	85,723,524	14,221,049	91,137,013	259,628,314
Total Loadings, Zero Discharge	0	0	0	0	0
Onsite Injection (20%S: 0%D)	0	0	0	0	0
Onshore Disposal (80%S:100%D)	0	0	0	0	0
<b>No. wells, OBF</b>	25	15	0	0	40
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Zero Discharge	15,709,100	19,751,761	0	0	35,460,861
Onsite Injection (20%S: 0%D)	3,141,820	3,950,352	0	0	7,092,172
Onshore Disposal (80%S:100%D)	12,567,280	15,801,409	0	0	28,368,689
Total Toxic Organics Discharge	42	25	6	17	90
Total Toxic Metals Discharge	1,037	619	142	410	2,208
Total Toxics Discharge	1,079	644	148	426	2,297
Total Non-conventionals Discharge	1,209,845	722,004	165,866	478,084	2,575,799

(Gulf of Mexico)	BAT 2: Onshore Disposal				
	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		
	Development	Exploratory	Development	Exploratory	Total
<b>No. wells, SBF</b>	124	74	17	49	264
Loadings/well (lbs)	16,100	33,739	24,364	54,170	
Total Loadings, Zero Discharge	1,996,395	2,496,661	414,182	2,654,327	7,561,565
Total Loadings, Discharge	66,550,333	83,226,863	13,806,867	88,482,686	252,066,749
Onsite Injection (0%S: 0%D)	0	0	0	0	0
Onshore Disposal (100%S:100%D)	1,996,395	2,496,661	414,182	2,654,327	7,561,565
<b>No. wells, OBF</b>	25	15	0	0	40
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Zero Discharge	15,709,100	19,751,761	0	0	35,460,861
Onsite Injection (20%S: 0%D)	3,141,820	3,950,352	0	0	7,092,172
Onshore Disposal (80%S:100%D)	12,567,280	15,801,409	0	0	28,368,689
Total Toxic Organics Discharge	38.76	23	5	15	83
Total Toxic Metals Discharge	953	569	131	377	2,030
Total Toxics Discharge	992	592	136	392	2,112
Total Non-conventionals Discharge	1,112,397	663,850	152,506	439,576	2,368,329
	BAT 3: Onshore Disposal				
	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		
	Development	Exploratory	Development	Exploratory	Total
<b>No. wells, SBF</b>	0	0	3	8	11
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Discharge	0	0	0	0	0
Total Loadings, Zero Discharge			2,852,661	16,913,557	19,766,219
Onsite Injection (20%S: 0%D)	0	0	0	0	0
Onshore Disposal (80%S:100%D)	0	0	2,852,661	16,913,557	19,766,219
<b>No. wells, OBF</b>	128	76	8	25	237
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Zero Discharge	80,430,593	100,075,587	7,607,097	52,854,866	240,968,143
Onsite Injection (20%S: 0%D)	16,086,119	20,015,117	0	0	36,101,236
Onshore Disposal (80%S:100%D)	64,344,474	80,060,470	7,607,097	52,854,866	204,866,907
Total SBF+OBF Zero Discharge Loadings:					
Total Zero Discharge Injection Loadings	16,086,119	20,015,117	0	0	36,101,236
Total Zero Discharge Onshore Loadings	64,344,474	80,060,470	10,459,758	69,768,423	224,633,126

WORKSHEET 6:

California : Zero Discharge Summary, Existing Sources

	Baseline: Zero Discharge				
	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total
	Development	Exploratory	Development	Exploratory	
<b>No. wells, SBF</b>	0	0	0	0	0
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Discharge	0	0	0	0	0
Total Loadings, Zero Discharge	0	0	0	0	0
Onsite Injection (80%; 0%DWE)	0	0	0	0	0
Onshore Disposal (20%; 100%DWE)	0	0	0	0	0
<b>No. wells, OBF</b>	1	1	0	0	2
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Zero Discharge	628,364	1,316,784	0	0	1,945,148
Onsite Injection (80%; 0%DWE)	628,364	1,316,784	0	0	1,945,148
Onshore Disposal (20%; 100%DWE)	0	0	0	0	0
Total Toxic Organics Discharge	0	0	0	0	0
Total Toxic Metals Discharge	0	0	0	0	0
Total Toxics Discharge	0	0	0	0	0
Total Non-conventionals Discharge	0	0	0	0	0
	BAT 1: Zero Discharge				
	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total
	Development	Exploratory	Development	Exploratory	
<b>No. wells, SBF</b>	0	0	0	0	0
Loadings/well (lbs)	552,796	1,158,426	836,532	1,859,939	
Total Loadings, Discharge	0	0	0	0	0
Total Loadings, Zero Discharge	0	0	0	0	0
Onsite Injection (80%; 0%DWE)	0	0	0	0	0
Onshore Disposal (20%; 100%DWE)	0	0	0	0	0
<b>No. wells, OBF</b>	1	1	0	0	2
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Zero Discharge	628,364	1,316,784	0	0	1,945,148
Onsite Injection (80%; 0%DWE)	628,364	1,316,784	0	0	1,945,148
Onshore Disposal (20%; 100%DWE)	0	0	0	0	0
Total Toxic Organics Discharge	0	0	0	0	0
Total Toxic Metals Discharge	0	0	0	0	0
Total Toxics Discharge	0	0	0	0	0
Total Non-conventionals Discharge	0	0	0	0	0

California	BAT 2: Onshore Disposal				
	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		
	Development	Exploratory	Development	Exploratory	Total
<b>No. wells, SBF</b>	0	0	0	0	0
Loadings/well (lbs)	16,100	33,739	24,364	54,170	
Total Loadings, Zero Discharge	0	0	0	0	0
Total Loadings, Discharge	0	0	0	0	0
Onsite Injection (80%; 0%DWE)	0	0	0	0	0
Onshore Disposal (20%; 100%DWE)	0	0	0	0	0
<b>No. wells, OBF</b>	1	1	0	0	2
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Zero Discharge	628,364	1,316,784	0	0	1,945,148
Onsite Injection (80%; 0%DWE)	628,364	1,316,784	0	0	1,945,148
Onshore Disposal (20%; 100%DWE)	0	0	0	0	0
Total Toxic Organics Discharge	0.00	0	0	0	0
Total Toxic Metals Discharge	0	0	0	0	0
Total Toxics Discharge	0	0	0	0	0
Total Non-conventionals Discharge	0	0	0	0	0
	BAT 3: Onshore Disposal				
	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		
	Development	Exploratory	Development	Exploratory	Total
<b>No. wells, SBF</b>	0	0	0	0	0
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Discharge	0	0	0	0	0
Total Loadings, Zero Discharge	0	0	0	0	0
Onsite Injection (80%; 0%DWE)	0	0	0	0	0
Onshore Disposal (20%; 100%DWE)	0	0	0	0	0
<b>No. wells, OBF</b>	1	1	0	0	2
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Zero Discharge	628,364	1,316,784	0	0	1,945,148
Onsite Injection (80%; 0%DWE)	628,364	1,316,784	0	0	1,945,148
Onshore Disposal (20%; 100%DWE)	0	0	0	0	0
Total SBF+OBF Zero Discharge Loadings:					
Total Zero Discharge Injection Loadings	628,364	1,316,784	0	0	1,945,148
Total Zero Discharge Onshore Loadings	0	0	0	0	0

WORKSHEET 7:

Alaska : Zero Discharge Summary, Existing Sources

Baseline: Zero Discharge Loadings					
	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total
	Development	Exploratory	Development	Exploratory	
<b>No. wells, SBF</b>	0	0	0	0	0
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Discharge	0	0	0	0	0
Total Loadings, Zero Discharge	0	0	0	0	0
Onsite Injection (100%)	0	0	0	0	0
Onshore Disposal ( 0%)	0	0	0	0	0
<b>No. wells, OBF</b>	1	1	0	0	2
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Zero Discharge	628,364	1,316,784	0	0	1,945,148
Onsite Injection (100%)	628,364	1,316,784	0	0	1,945,148
Onshore Disposal ( 0%)	0	0	0	0	0
Total Toxic Organics Discharge	0	0	0	0	0
Total Toxic Metals Discharge	0	0	0	0	0
Total Toxics Discharge	0	0	0	0	0
Total Non-conventionals Discharge	0	0	0	0	0
BAT 1: Zero Discharge Loadings					
	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total
	Development	Exploratory	Development	Exploratory	
<b>No. wells, SBF</b>	1	0	0	0	1
Loadings/well (lbs)	552,796	1,158,426	836,532	1,859,939	
Total Loadings, Discharge	552,796	0	0	0	552,796
Total Loadings, Zero Discharge	0	0	0	0	0
Onsite Injection (100%)	0	0	0	0	0
Onshore Disposal ( 0%)	0	0	0	0	0
<b>No. wells, OBF</b>	0	1	0	0	1
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Zero Discharge	0	1,316,784	0	0	1,316,784
Onsite Injection (100%)	0	1,316,784	0	0	1,316,784
Onshore Disposal ( 0%)	0	0	0	0	0
Total Toxic Organics Discharge	0	0	0	0	0
Total Toxic Metals Discharge	8	0	0	0	8
Total Toxics Discharge	9	0	0	0	9
Total Non-conventionals Discharge	9,757	0	0	0	9,757

Alaska		BAT 2: Onshore Disposal				
Onshore Disposal	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)			
	Development	Exploratory	Development	Exploratory	Total	
No. wells, SBF	1	0	0	0	1	
Loadings/well (lbs)	16,100	33,739	24,364	54,170		
Total Loadings, Zero Discharge	16,100	0	0	0	16,100	
Total Loadings, Discharge	536,696	0	0	0	536,696	
Onsite Injection (100%)	16,100	0	0	0	16,100	
Onshore Disposal ( 0%)	0	0	0	0	0	
No. wells, OBF	0	1	0	0	1	
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195		
Total Loadings, Zero Discharge	0	1,316,784	0	0	1,316,784	
Onsite Injection (100%)	0	1,316,784	0	0	1,316,784	
Onshore Disposal ( 0%)	0	0	0	0	0	
Total Toxic Organics Discharge	0.31	0	0	0	0	
Total Toxic Metals Discharge	8	0	0	0	8	
Total Toxics Discharge	8	0	0	0	8	
Total Non-conventionals Discharge	8,971	0	0	0	8,971	
	BAT 3: Onshore Disposal					
	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)			
	Development	Exploratory	Development	Exploratory	Total	
No. wells, SBF	0	0	0	0	0	
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195		
Total Loadings, Discharge	0	0	0	0	0	
Total Loadings, Zero Discharge	0	0	0	0	0	
Onsite Injection (100%)	0	0	0	0	0	
Onshore Disposal ( 0%)	0	0	0	0	0	
No. wells, OBF	1	1	0	0	2	
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195		
Total Loadings, Zero Discharge	628,364	1,316,784	0	0	1,945,148	
Onsite Injection (100%)	628,364	1,316,784	0	0	1,945,148	
Onshore Disposal ( 0%)	0	0	0	0	0	
Total SBF+OBF Zero Discharge Loadings:						
Total Zero Disharge Injection Loadings	628,364	1,316,784	0	0	1,945,148	
Total Zero Discharge Onshore Loadings	0	0	0	0	0	

**WORKSHEET 8:**
**Gulf of Mexico: Zero Discharge Summary, New Sources**

Baseline: Zero Discharge Loadings					
	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total
	Development	Exploratory	Development	Exploratory	
<b>No. wells, SBF</b>	5	0	15	0	20
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Discharge	3,141,820	0	14,263,307	0	17,405,127
Total Wells, Zero Discharge	0	0	0	0	0
Onsite Injection (20%S: 0%D)	0	0	0	0	0
Onshore Disposal (80%S:100%D)	0	0	0	0	0
<b>No. wells, OBF</b>	2	0	0	0	2
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Zero Discharge	1,256,728	0	0	0	1,256,728
Onsite Injection (20%S: 0%D)	0	0	0	0	0
Onshore Disposal (80%S:100%D)	1,256,728	0	0	0	1,256,728
Total Toxic Organics Discharge	5	0	15	0	20
Total Toxic Metals Discharge	124	0	371	0	494
Total Toxics Discharge	129	0	386	0	514
Total Non-conventionals Discharge	144,175	0	432,526	0	576,701
NSPS 1: Zero Discharge					
	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total
	Development	Exploratory	Development	Exploratory	
<b>No. wells, SBF</b>	8	0	16	0	24
Loadings/well (lbs)	552,796	1,158,426	836,532	1,859,939	
Total Loadings, Discharge	4,422,370	0	13,384,517	0	17,806,886
Total Wells, Zero Discharge	0	0	0	0	0
Onsite Injection (20%S:0%D)	0	0	0	0	0
Haul/Onshore Disposal (80%S:100%D)	0	0	0	0	0
<b>No. wells, OBF</b>	1	0	0	0	1
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Zero Discharge	628,364	0	0	0	628,364
Onsite Injection (20%S:0%D)	0	0	0	0	0
Haul/Onshore Disposal (80%S:100%D)	628,364	0	0	0	628,364
Total Toxic Organics Discharge	3	0	5	0	8
Total Toxic Metals Discharge	67	0	134	0	201
Total Toxics Discharge	70	0	139	0	209
Total Non-conventionals Discharge	78,055	0	156,109	0	234,164

Gulf of Mexico NSPS 2	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total
	Development	Exploratory	Development	Exploratory	
<b>Onshore Disposal</b>					
<b>No. wells, SBF</b>	8	0	16	0	24
Loadings/well (lbs)	16,100	33,739	24,364	54,170	
Total Loadings, Zero Discharge	128,800	0	389,818	0	518,618
Total Loadings, Discharge	4,293,570	0	12,994,698	0	17,288,268
Onsite Injection (0%S: 0%D)	0	0	0	0	0
Onshore Disposal (100%S:100%D)	128,800	0	389,818	0	518,618
<b>No. wells, OBF</b>	1	0	0	0	1
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Zero Discharge	628,364	0	0	0	628,364
Onsite Injection (20%S: 0%D)	0	0	0	0	0
Onshore Disposal (80%S:100%D)	628,364	0	0	0	628,364
Total Toxic Organics Discharge	2.50	0	5	0	8
Total Toxic Metals Discharge	62	0	123	0	185
Total Toxics Discharge	64	0	128	0	192
Total Non-conventionals Discharge	71,768	0	143,535	0	215,303
NSPS 3: Zero Discharge					
	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total
	Development	Exploratory	Development	Exploratory	
<b>No. wells, SBF</b>	0	0	3	0	3
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Zero Discharge	0	0	2,852,661	0	2,852,661
Total Loadings Discharge	0	0	0	0	0
Onsite Injection (20%S: 0%D)	0	0	950,887	0	950,887
Onshore Disposal (80%S:100%D)	0	0	1,901,774	0	1,901,774
<b>No. wells, OBF</b>	7	0	8	0	15
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Zero Discharge	4,398,548	0	7,607,097	0	12,005,645
Onsite Injection (20%S: 0%D)	628,364	0	1,901,774	0	2,530,138
Onshore Disposal (80%S:100%D)	3,770,184	0	5,705,323	0	9,475,507
Total SBF+OBF Zero Discharge Loadings:					
Total Zero Discharge Injection Loadings	628,364	0	2,852,661	0	3,481,025
Total Zero Discharge Onshore Loadings	3,770,184	0	7,607,097	0	11,377,281



WORKSHEET 9:

California : Zero Discharge Summary, New Sources

Baseline: Zero Discharge Loadings					
	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total
	Development	Exploratory	Development	Exploratory	
<b>No. wells, SBF</b>	0	0	0	0	0
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Discharge	0	0	0	0	0
Total Loadings, Zero Discharge	0	0	0	0	0
Onsite Injection (80%; 0%DWE)	0	0	0	0	0
Onshore Disposal (20%; 100%DWE)	0	0	0	0	0
<b>No. wells, OBF</b>	0	0	0	0	0
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Zero Discharge	0	0	0	0	0
Onsite Injection (80%; 0%DWE)	0	0	0	0	0
Onshore Disposal (20%; 100%DWE)	0	0	0	0	0
Total Toxic Organics Discharge	0	0	0	0	0
Total Toxic Metals Discharge	0	0	0	0	0
Total Toxics Discharge	0	0	0	0	0
Total Non-conventionals Discharge	0	0	0	0	0
NSPS 1: Zero Discharge					
	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total
	Development	Exploratory	Development	Exploratory	
<b>No. wells, SBF</b>	0	0	0	0	0
Loadings/well (lbs)	552,796	1,158,426	836,532	1,859,939	
Total Loadings, Discharge	0	0	0	0	0
Total Loadings, Zero Discharge	0	0	0	0	0
Onsite Injection (80%; 0%DWE)	0	0	0	0	0
Onshore Disposal (20%; 100%DWE)	0	0	0	0	0
<b>No. wells, OBF</b>	0	0	0	0	0
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Zero Discharge	0	0	0	0	0
Onsite Injection (80%; 0%DWE)	0	0	0	0	0
Onshore Disposal (20%; 100%DWE)	0	0	0	0	0
Total Toxic Organics Discharge	0	0	0	0	0
Total Toxic Metals Discharge	0	0	0	0	0
Total Toxics Discharge	0	0	0	0	0
Total Non-conventionals Discharge	0	0	0	0	0

California NSPS 2	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total
	Development	Exploratory	Development	Exploratory	
<b>No. wells, SBF</b>	0	0	0	0	0
Loadings/well (lbs)	16,100	33,739	24,364	54,170	0
Total Loadings, Zero Discharge	0	0	0	0	0
Total Loadings, Discharge	0	0	0	0	0
Onsite Injection (80%; 0%DWE)	0	0	0	0	0
Onshore Disposal (20%; 100%DWE)	0	0	0	0	0
<b>No. wells, OBF</b>	0	0	0	0	0
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	0
Total Loadings, Zero Discharge	0	0	0	0	0
Onsite Injection (80%; 0%DWE)	0	0	0	0	0
Onshore Disposal (20%; 100%DWE)	0	0	0	0	0
Total Toxic Organics Discharge	0.00	0	0	0	0
Total Toxic Metals Discharge	0	0	0	0	0
Total Toxics Discharge	0	0	0	0	0
Total Non-conventionals Discharge	0	0	0	0	0
<b>NSPS 3: Zero Discharge</b>					
	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total
	Development	Exploratory	Development	Exploratory	
<b>No. wells, SBF</b>	0	0	0	0	0
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	0
Total Loadings, Zero Discharge	0	0	0	0	0
Total Loadings Discharge	0	0	0	0	0
Onsite Injection (80%; 0%DWE)	0	0	0	0	0
Onshore Disposal (20%; 100%DWE)	0	0	0	0	0
<b>No. wells, OBF</b>	0	0	0	0	0
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	0
Total Loadings, Zero Discharge	0	0	0	0	0
Onsite Injection (80%; 0%DWE)	0	0	0	0	0
Onshore Disposal (20%; 100%DWE)	0	0	0	0	0
Total SBF+OBF Zero Discharge Loadings:					
Total Zero Discharge Injection Loadings	0	0	0	0	0
Total Zero Discharge Onshore Loadings	0	0	0	0	0

WORKSHEET 10:

Cook Inlet, Alaska : Zero Discharge Summary, New Sources

Baseline: Zero Discharge Loadings					
	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total
	Development	Exploratory	Development	Exploratory	
<b>No. wells, SBF</b>	0	0	0	0	0
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Discharge	0	0	0	0	0
Total Loadings, Zero Discharge	0	0	0	0	0
Onsite Injection (100%)	0	0	0	0	0
Onshore Disposal ( 0%)	0	0	0	0	0
<b>No. wells, OBF</b>	0	0	0	0	0
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Zero Discharge	0	0	0	0	0
Onsite Injection (100%)	0	0	0	0	0
Onshore Disposal ( 0%)	0	0	0	0	0
Total Toxic Organics Discharge	0	0	0	0	0
Total Toxic Metals Discharge	0	0	0	0	0
Total Toxics Discharge	0	0	0	0	0
Total Non-conventionals Discharge	0	0	0	0	0
NSPS 1: Zero Discharge					
	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total
	Development	Exploratory	Development	Exploratory	
<b>No. wells, SBF</b>	0	0	0	0	0
Loadings/well (lbs)	552,796	1,158,426	836,532	1,859,939	
Total Loadings, Discharge	0	0	0	0	0
Total Loadings, Zero Discharge	0	0	0	0	0
Onsite Injection (100%)	0	0	0	0	0
Onshore Disposal ( 0%)	0	0	0	0	0
<b>No. wells, OBF</b>	0	0	0	0	0
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Zero Discharge	0	0	0	0	0
Onsite Injection (100%)	0	0	0	0	0
Onshore Disposal ( 0%)	0	0	0	0	0
Total Toxic Organics Discharge	0	0	0	0	0
Total Toxic Metals Discharge	0	0	0	0	0
Total Toxics Discharge	0	0	0	0	0
Total Non-conventionals Discharge	0	0	0	0	0

Alaska NSPS 2		Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)	
Onshore Disposal	Development	Exploratory	Development	Exploratory	Total
No. wells, SBF	0	0	0	0	0
Loadings/well (lbs)	16,100	33,739	24,364	54,170	
Total Loadings, Zero Discharge	0	0	0	0	0
Total Loadings, Discharge	0	0	0	0	0
Onsite Injection (100%)	0	0	0	0	
Onshore Disposal ( 0%)	0	0	0	0	0
No. wells, OBF	0	0	0	0	0
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Zero Discharge	0	0	0	0	0
Onsite Injection (100%)	0	0	0	0	0
Onshore Disposal ( 0%)	0	0	0	0	0
Total Toxic Organics Discharge	0.00	0	0	0	0
Total Toxic Metals Discharge	0	0	0	0	0
Total Toxics Discharge	0	0	0	0	0
Total Non-conventionals Discharge	0	0	0	0	0
NSPS 3: Zero Discharge					
	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		
	Development	Exploratory	Development	Exploratory	Total
No. wells, SBF	0	0	0	0	0
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Zero Discharge	0	0	0	0	0
Total Loadings Discharge	0	0	0	0	0
Onsite Injection (100%)	0	0	0	0	0
Onshore Disposal ( 0%)	0	0	0	0	0
No. wells, OBF	0	0	0	0	0
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Zero Discharge	0	0	0	0	0
Onsite Injection (100%)	0	0	0	0	0
Onshore Disposal ( 0%)	0	0	0	0	0
Total SBF+OBF Zero Discharge Loadings:					
Total Zero Disharge Injection Loadings	0	0	0	0	0
Total Zero Discharge Onshore Loadings	0	0	0	0	0

**WORKSHEET No. 11:**
**POLLUTANT LOADINGS FROM WATER-BASED DRILLING FLUID: CONVENTIONAL POLLUTANTS FROM DISCHARGED CUTTINGS, EXISTING SOURCES**

POLLUTANTS FROM DISCHARGED CUTTINGS (Conventionals)	Shallow Well			Deep Well			Totals
	GOM	CA	AK	GOM	CA	AK	
(from ODD: Table XI-2, p XI-4)							
well depth, TD	10,559	7,607	10,633	13,037	10,082	12,354	
no. wells , total by region (from Exh. 2)	857	5	4	857	5	4	866
% WBF (total-OBF) wells discharging (from Exh. 1)	45.06%	51.25%	36.23%	36.80%	31.54%	44.31%	
no. wells discharging cuttings, by region	386	3	1	315	2	2	709
cuttings discharged , bbl per well	1,475	1,242	1,480	2,458	1,437	2,413	
<b>CUTTINGS TSS ANALYSIS:</b>							
lbs TSS / bbl (from Exh. 3)	551	551	551	551	551	551	
lbs TSS per well	812,209	683,907	814,962	1,353,498	791,284	1,328,718	
total lbs TSS	313,512,578	2,051,722	814,962	426,351,776	1,582,568	2,657,437	746,971,042
Gulf of Mexico							739,864,353
California							3,634,290
Alaska							3,472,399
total volume cuttings, bbl	569,350	3,726	1,480	774,270	2,874	4,826	1,356,526
Gulf of Mexico							1,343,620
California							6,600
Alaska							6,306
<b>CUTTINGS OIL ANALYSIS:</b>							
% wells , by type and region (from Exh. 1)	51.00%	58.00%	41.00%	49.00%	42.00%	59.00%	
total no. wells, by region (from Exh. 2)	857	5	4	857	5	4	866
no. wells, by type and region	437	3	2	420	2	2	866
% wells using MO spot or lube & discharging (from Exh. 1)	10.41%	11.83%	8.37%	8.50%	7.28%	10.23%	
no. wells using MO and discharging	45	-	-	36	-	-	81
cuttings discharged per well, bbl	1,475	1,242	1,480	2,458	1,437	2,413	
fraction adherent fluid (from Exh. 3)	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	
volume adherent fluid, per well, bbl	74	62	74	123	72	121	
MO, lbs per bbl (from Exh. 3)	9	9	9	9	9	9	
MO, lbs per well	666	558	666	1,107	648	1,089	
total lbs MO	29,970	-	-	39,852	-	-	69,822
Gulf of Mexico							69,822
California							-
Alaska							-
total volume MO, bbl	3,330	-	-	4,428	-	-	7,758
Gulf of Mexico							7,758
California							-
Alaska							-
<b>TOTAL CONVENTIONAL POLLUTANTS</b>							
lbs conventional pollutants discharged	313,542,548	2,051,722	814,962	426,391,628	1,582,568	2,657,437	747,040,864
Gulf of Mexico							739,934,175
California							3,634,290
Alaska							3,472,399
bbl conventional pollutants discharged	572,680	3,726	1,480	778,698	2,874	4,826	1,364,284
Gulf of Mexico							1,351,378
California							6,600
Alaska							6,306

**WORKSHEET No. 12:**
**POLLUTANT LOADINGS FROM WATER-BASED DRILLING FLUID: CONVENTIONAL POLLUTANTS FROM DISCHARGED DRILLING FLUID, EXISTING SOURCES**

POLLUTANTS FROM DISCHARGED DRILLING FLUIDS (Conventionals)			Shallow Well			Deep Well			Totals
( from ODD: Table XI-2, p XI-4)			GOM	CA	AK	GOM	CA	AK	
well depth, TD (from Exh. 5A)			10,559	7,607	10,633	13,037	10,082	12,354	
no. wells , total (from Exh. 2)			857	5	4	857	5	4	866
no. wells discharging fluids (from Exh. 5A)			386	3	1	315	2	2	709
drilling fluids (bbl) per well			6,938	5,939	6,963	9,752	6,777	9,458	
<b>WB FLUIDS TSS ANALYSIS:</b>									
lbs TSS / bbl (from Exh. 3)			153	153	153	153	153	153	
lbs TSS per well			1,061,514	908,667	1,065,339	1,492,056	1,036,881	1,447,074	
total lbs TSS			409,744,404	2,726,001	1,065,339	469,997,640	2,073,762	2,894,148	888,501,294
Gulf of Mexico									879,742,044
California									4,799,763
Alaska									3,959,487
total volume, bbl, WB fluids			2,678,068	17,817	6,963	3,071,880	13,554	18,916	5,807,198
Gulf of Mexico									5,749,948
California									31,371
Alaska									25,879
<b>WB FLUIDS OIL ANALYSIS:</b>									
% wells using MO spot or lube, discharging (from Exh. 1)			10.41%	11.83%	8.37%	8.50%	7.28%	10.23%	
no. wells using MO and discharging (from Exh. 5A)			45	-	-	36	-	-	81
WB fluids discharged per well, bbl			6,938	5,939	6,963	9,752	6,777	9,458	
MO, lbs per bbl (from Exh. 3)			9	9	9	9	9	9	9
MO, lbs per well			62,442	53,451	62,667	87,768	60,993	85,122	85,122
total lbs MO			2,809,890	-	-	3,159,648	-	-	5,969,538
Gulf of Mexico									5,969,538
California									-
Alaska									-
total volume MO, bbl			9,421	-	-	10,593	-	-	20,014
Gulf of Mexico			423,935	-	-	381,363	-	-	805,299
California									-
Alaska									-
<b>TOTAL CONVENTIONAL POLLUTANTS:</b>									
lbs conventional pollutants discharged			412,554,294	2,726,001	1,065,339	473,157,288	2,073,762	2,894,148	894,470,832
Gulf of Mexico									885,711,582
California									4,799,763
Alaska									3,959,487
bbl conventional pollutants discharged			2,687,489	17,817	6,963	3,082,473	13,554	18,916	5,827,212
Gulf of Mexico									5,769,962
California									31,371
Alaska									25,879
Avg GOM drilling fluid discharged, bbl/day (20-day drilling program)			347	297	348	488	339	473	
Avg adherent fluid (5%) on cuttings discharged GOM, bbl/day			4	3	4	6	4	6	
Total avg per well GOM drilling fluid discharged, bbl/day			351	300	352	494	342	479	2,318
no. wells discharging fluids			386			315			701
Total GOM drilling fluid discharges, bbl/day			135,327			155,530			290,856
GOM-wide wtd avg drilling fluid discharges, bbl/day									415

**WORKSHEET No. 13:**
**POLLUTANT LOADINGS FROM WATER-BASED DRILLING FLUID: TOXIC/NON-CONVENTIONAL POLLUTANTS  
FROM DISCHARGED DRILLING FLUID, EXISTING SOURCES**

POLLUTANTS FROM DISCHARGED DRILLING FLUIDS (Toxics & Non-conventionals)			Shallow Well			Deep Well			Totals	
<b>TOXICS</b>			GOM	CA	AK	GOM	CA	AK		
( from ODD: Table XI-2, p XI-4)										
Well Depth, TD	(from Exh. 5A)		10,559	7,607	10,633	13,037	10,082	12,354		
No. wells , total	(from Exh. 2)		857	5	4	857	5	4	866	
No. wells discharging cuttings	(from Exh. 5A)		386	3	1	315	2	2	709	
Drilling fluidsDischarged (bbl) per well			6,938	5,939	6,963	9,752	6,777	9,458		
<b>WB FLUIDS TOXICS/NON-CONVENTIONALS:</b>										
lbs toxics/non-conventionals/ bbl	(from Exh. 3)		37.7	37.7	37.7	37.7	37.7	37.7		
lbs toxics/non-conventionals per well			261,629	223,957	262,572	367,744	255,558	356,657		
total lbs toxics/non-conventionals			100,988,785	671,871	262,572	115,839,265	511,115	713,314	218,986,922	
Gulf of Mexico									216,828,049	
California									1,182,987	
Alaska									975,886	
total volume, bbl, WB fluids			2,678,068	17,817	6,963	3,071,880	13,554	18,916	5,807,198	
Gulf of Mexico									5,749,948	
California									31,371	
Alaska									25,879	
<b>WB FLUIDS MINERAL OIL TOXICS/NON-CONVENTIONALS:</b>										
% wells using MO spot or lube, discharging	(from Exh. 1)		10.41%	11.83%	8.37%	8.50%	7.28%	10.23%		
no. wells using MO and discharging	(from Exh. 5A)		45	-	-	36	-	-	81	
WB fluids discharged per well, bbl			6,938	5,939	6,963	9,752	6,777	9,458		
mineral oil toxics, lb / bbl	(from Exh. 3)		0.324	0.324	0.324	0.324	0.324	0.324		
mineral oil toxics, lbs / well			2,247	1,924	2,256	3,159	2,195	3,064	14,845	
total lbs mineral oil toxics			101,134	-	-	113,722	-	-	214,856	
Gulf of Mexico									214,856	
California									-	
Alaska									-	
<b>TOTAL TOXIC/NON-CONVENTIONAL POLLUTANTS:</b>										
lbs conventional pollutants discharged			101,089,918	671,871	262,572	115,952,987	511,115	713,314	219,201,778	
Gulf of Mexico									217,042,905	
California									1,182,987	
Alaska									975,886	

**WORKSHEET No. 14:**
**POLLUTANT LOADINGS FROM WATER-BASED DRILLING FLUID: CONVENTIONAL POLLUTANTS FROM DISCHARGED CUTTINGS, NEW SOURCES**

POLLUTANTS FROM DISCHARGED CUTTINGS (Conventionals) (from ODD: Table XI-2, p XI-4)	Shallow Well			Deep Well			Totals
	GOM	CA	AK	GOM	CA	AK	
well depth, TD	10,559	7,607	10,633	13,037	10,082	12,354	
no. wells, total by region (from Exh. 2)	38	-	-	38	-	-	38
% WBF (total-OBF) wells discharging (from Exh. 1)	45.06%	51.25%	36.23%	36.80%	31.54%	44.31%	
no. wells discharging cuttings, by region	17	0	0	14	0	0	31
cuttings discharged, bbl per well	1,475	1,242	1,480	2,458	1,437	2,413	
<b>CUTTINGS TSS ANALYSIS:</b>							
lbs TSS / bbl (from Exh. 3)	551	551	551	551	551	551	
lbs TSS per well	812,209	683,907	814,962	1,353,498	791,284	1,328,718	
<b>total lbs TSS</b>	<b>13,807,549</b>	<b>0</b>	<b>0</b>	<b>18,948,968</b>	<b>0</b>	<b>0</b>	<b>32,756,517</b>
Gulf of Mexico							32,756,517
California							-
Alaska							-
total volume cuttings, bbl	25,075	0	0	34,412	0	0	<b>59,487</b>
Gulf of Mexico							59,487
California							-
Alaska							-
<b>CUTTINGS OIL ANALYSIS:</b>							
% wells, by type and region (from Exh. 1)	51.00%	58.00%	41.00%	49.00%	42.00%	59.00%	
total no. wells, by region (from Exh. 2)	38	-	-	38	-	-	38
no. wells, by type and region	19	0	0	19	0	0	19
% wells using MO spot or lube & discharging (from Exh. 1)	10.41%	11.83%	8.37%	8.50%	7.28%	10.23%	
no. wells using MO and discharging	2	0	0	2	0	0	4
cuttings discharged per well, bbl	1,475	1,242	1,480	2,458	1,437	2,413	
fraction adherent fluid (from Exh. 3)	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	
volume adherent fluid, per well, bbl	74	62	74	123	72	121	
MO, lbs per bbl (from Exh. 3)	9	9	9	9	9	9	
MO, lbs per well	666	558	666	1,107	648	1,089	
<b>total lbs MO</b>	<b>1,332</b>	<b>0</b>	<b>0</b>	<b>2,214</b>	<b>0</b>	<b>0</b>	<b>3,546</b>
Gulf of Mexico							3,546
California							-
Alaska							-
total volume MO, bbl	148	0	0	246	0	0	<b>394</b>
Gulf of Mexico							394
California							-
Alaska							-
<b>TOTAL CONVENTIONAL POLLUTANTS</b>							
lbs conventional pollutants discharged	13,808,881	0	0	18,951,182	0	0	<b>32,760,063</b>
Gulf of Mexico							32,760,063
California							-
Alaska							-
bbl conventional pollutants discharged	25,223	0	0	34,658	0	0	<b>59,881</b>
Gulf of Mexico							59,881
California							-
Alaska							-



**WORKSHEET No. 15:**
**POLLUTANT LOADINGS FROM WATER-BASED DRILLING FLUID: CONVENTIONAL POLLUTANTS FROM DISCHARGED DRILLING FLUID, NEW SOURCES**

POLLUTANTS FROM DISCHARGED DRILLING FLUIDS (Conventionals)		Shallow Well			Deep Well			Totals
(from ODD: Table XI-2, p XI-4)		GOM	CA	AK	GOM	CA	AK	
well depth, TD (from Exh. 5A)		10,559	7,607	10,633	13,037	10,082	12,354	
no. wells , total (from Exh. 2)		38	-	-	38	-	-	38
no. wells discharging fluids (from Exh. 5A)		17	0	0	14	0	0	31
drilling fluids (bbl) per well		6,938	5,939	6,963	9,752	6,777	9,458	
<b>WB FLUIDS TSS ANALYSIS:</b>								
lbs TSS / bbl (from Exh. 3)		153	153	153	153	153	153	
lbs TSS per well		1,061,514	908,667	1,065,339	1,492,056	1,036,881	1,447,074	
total lbs TSS		18,045,738	-	-	20,888,784	-	-	38,934,522
Gulf of Mexico								38,934,522
California								-
Alaska								-
total volume, bbl, WB fluids		117,946	-	-	136,528	-	-	254,474
Gulf of Mexico								254,474
California								-
Alaska								-
<b>WB FLUIDS OIL ANALYSIS:</b>								
% wells using MO spot or lube, discharging (from Exh. 1)		10.41%	11.83%	8.37%	8.50%	7.28%	10.23%	
no. wells using MO and discharging (from Exh. 5A)		2	-	-	2	-	-	4
WB fluids discharged per well, bbl		6,938	5,939	6,963	9,752	6,777	9,458	
MO, lbs per bbl (from Exh. 3)		9	9	9	9	9	9	9
MO, lbs per well		62,442	53,451	62,667	87,768	60,993	85,122	85,122
total lbs MO		124,884	-	-	175,536	-	-	300,420
Gulf of Mexico								300,420
California								-
Alaska								-
total volume MO, bbl		419	-	-	589	-	-	1,007
Gulf of Mexico		837	-	-	1,177	-	-	2,014
California								-
Alaska								-
<b>TOTAL CONVENTIONAL POLLUTANTS:</b>								
lbs conventional pollutants discharged		18,170,622	-	-	21,064,320	-	-	39,234,942
Gulf of Mexico								39,234,942
California								-
Alaska								-
bbl conventional pollutants discharged		118,365	-	-	137,117	-	-	255,481
Gulf of Mexico								255,481
California								-
Alaska								-
Avg GOM drilling fluid discharged, bbl/day (20-day drilling program)		347	297	348	488	339	473	
Avg adherent fluid (5%) on cuttings discharged GOM, bbl/day		-	-	-	-	-	-	
Total avg per well GOM drilling fluid discharged, bbl/day		347	297	348	488	339	473	2,291
no. wells discharging fluids		17			14			31
Total GOM drilling fluid discharges, bbl/day		5,897			6,826			12,724
GOM-wide wtd avg drilling fluid discharges, bbl/day								410

**WORKSHEET No. 16:**
**POLLUTANT LOADINGS FROM WATER-BASED DRILLING FLUID: TOXIC/NON-CONVENTIONAL POLLUTANTS FROM DISCHARGED DRILLING FLUID, NEW SOURCES**

POLLUTANTS FROM DISCHARGED DRILLING FLUIDS (Toxics & Non-conventionals)			Shallow Well			Deep Well			Totals	
<b>TOXICS</b>			GOM	CA	AK	GOM	CA	AK		
( from ODD: Table XI-2, p XI-4)										
Well Depth, TD	(from Exh. 5A)		10,559	7,607	10,633	13,037	10,082	12,354		
No. wells , total	(from Exh. 2)		38	-	-	38	-	-	38	
No. wells discharging cuttings	(from Exh. 5A)		17	0	0	14	0	0	31	
Drilling fluidsDischarged (bbl) per well			6,938	5,939	6,963	9,752	6,777	9,458		
<b>WB FLUIDS TOXICS/NON-CONVENTIONALS:</b>										
lbs toxics/non-conventionals/ bbl	(from Exh. 3)		37.7	37.7	37.7	37.7	37.7	37.7		
lbs toxics/non-conventionals per well			261,629	223,957	262,572	367,744	255,558	356,657		
total lbs toxics/non-conventionals			4,447,693	-	-	5,148,412	-	-	9,596,104	
Gulf of Mexico									9,596,104	
California									-	
Alaska									-	
total volume, bbl, WB fluids			117,946	-	-	136,528	-	-	254,474	
Gulf of Mexico									254,474	
California									-	
Alaska									-	
<b>WB FLUIDS MINERAL OIL TOXICS/NON-CONVENTIONALS:</b>										
% wells using MO spot or lube, discharging	(from Exh. 1)		0	0	0	0	0	0		
no. wells using MO and discharging	(from Exh. 5A)		2	-	-	2	-	-	4	
WB fluids discharged per well, bbl			6,938	5,939	6,963	9,752	6,777	9,458		
mineral oil toxics, lb / bbl	(from Exh. 3)		0.324	0.324	0.324	0.324	0.324	0.324		
mineral oil toxics, lbs / well			2,247	1,924	2,256	3,159	2,195	3,064	14,845	
total lbs mineral oil toxics			4,495	-	-	6,318	-	-	10,813	
Gulf of Mexico									10,813	
California									-	
Alaska									-	
<b>TOTAL TOXIC/NON-CONVENTIONAL POLLUTANTS:</b>										
lbs conventional pollutants discharged			4,452,187	-	-	5,154,730	-	-	9,606,917	
Gulf of Mexico									9,606,917	
California									-	
Alaska									-	

## **APPENDIX VIII-5**

### **Pollutant Loadings (Removals) Supporting Worksheets**

## WORKSHEET A:

### Input Data for Model Wells -- Base Fluid Retention and Drill Cuttings Volume Calculations, Synthetic-based Fluid Analyses

#### Densities for SBF Components and Drill Cuttings:

SBF Base fluid (lbs/bbl):	280.0
SBF Barite (lbs/bbl):	1,506.0
SBF Water (lbs/bbl):	350.5
Dry Formation Cuttings (lbs/bbl):	910.0
Formation Oil (as diesel) (lbs/bbl):	294.0

#### SBF Fraction Data:

Basefluid Fraction of Standard SBF (wt./wt.):	47%
Barite Fraction of Standard SBF (wt./wt.):	33%
Water Fraction of Standard SBF (wt./wt.):	20%

#### SBF Formulation Density (lbs./gal.):

9.65

#### Model Well Volume Data:

Shallow Water, Exploratory (barrels):	1,184.0
Deep Water, Exploratory (barrels):	1,901.0
Shallow Water, Development (barrels):	565.0
Deep Water, Development (barrels):	855.0

#### Formation Oil Contamination:

0.20%

#### Base Fluid Fraction of Wet Cuttings (W/W) for Solids Control Equipment:

Primary Shale Shakers:	9.32%
Secondary Shale Shakers:	13.80%
Cuttings Dryer:	3.82%
Fines Removal Unit:	10.70%

#### Fraction of Total Wet Cuttings Discharge (V/V) for SolidsControl Equipment

##### Various BPT and BAT/NSPS Options:

BPT	Primary Shale Shakers:	78.5%
	Secondary Shale Shakers:	18.5%
	Fines Removal Unit:	3.0%

BAT/NSPS Option 1	Cuttings Dryer:	97.0%
	Fines Removal Unit:	3.0%

BAT/NSPS Option 2	Cuttings Dryer:	100.0%
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#### Base Fluid Fraction of Discharged Wet Cuttings (W/W) for BAT/NSPS Options:

BPT:	10.20%
BAT/NSPS Option 1 (Two Discharges):	4.03%
BAT/NSPS Option 2 (One Discharge):	3.82%

#### Equations Used to Calculate Loadings

$$\begin{aligned}\text{Total Cuttings Waste Discharged (lbs)} &= (\text{DC}) / (1 - (1/\text{SF}) * \text{CRN}) \\ \text{SBF Basefluid Discharged (lbs)} &= \text{CRN} * \text{TW} \\ \text{SBF Water Discharged (lbs)} &= (\text{WF}/\text{SF}) * (\text{CRN} * \text{TW}) \\ \text{SBF Barite Discharged (lbs)} &= (\text{BF}/\text{SF}) * (\text{CRN} * \text{TW})\end{aligned}$$

where:

TW = Total Cuttings Waste Discharged (lbs)  
DC = Dry Drill Cuttings Discharged (lbs)  
CRN = SBF Basefluid Fraction on TW (Cuttings Retention Number) (wt./wt.)  
SF = SBF Basefluid Fraction (wt./wt.) in Drilling Fluid Formulation  
WF = SBF Water Fraction (wt./wt.) in Drilling Fluid Formulation  
BF = SBF Barite Fraction (wt./wt.) in Drilling Fluid Formulation  
SBFV = Whole Synthetic Based Fluid Volume

#### Notes:

- \* Assume SF + WF + BF = 1
- \* DC is calculated from model well size
- \* SBFV is the sum total of SBF basefluid, barite, and water (in bbl) discharged
- \* Total Cuttings Waste Discharged in BAT/NSPS Option 2 is equivalent to the volume fraction of total cuttings waste discharged from cuttings dryer multiplied against the total cuttings waste calculated in BAT/NSPS Option 1
- \* Total Cuttings Waste Not Discharged in BAT/NSPS Option 2 is equivalent to the volume fraction of total cuttings waste discharged from the fines removal unit (FRU) multiplied against the total cuttings waste calculated in BAT/NSPS Option 1
- \* Dry Drill Cuttings Discharged in BAT/NSPS Option 2 is equivalent to the arithmetic difference between the BAT/NSPS Option 2 Total Cuttings Waste Discharged and the BAT/NSPS Option 2 SBF (Basefluid, Barite, Water) Discharged
- \* Dry Drill Cuttings Not Discharged in BAT/NSPS Option 2 is equivalent to the arithmetic difference between the BAT/NSPS Option 2 Total Cuttings Waste Not Discharged and the BAT/NSPS Option 2 SBF (Basefluid, Barite, Water) Not Discharged

**WORKSHEET No. B:**
**ANALYSIS OF WBF PASS/FAIL PERMIT LIMITS (SHEEN; TOXICITY); FAILS HAULED TO ONSHORE DISPOSAL(a,b,c)**

		% Wells/region Shallow/deep % split	No lube /lube % split	No spot /spot % split	Proj'd Tox / Sheen Limit Failure Rate	Proj'd % Wells Fail Permit Lim	Proj'd % Wells Pass Permit Lim	Sum lube(s) spot(s), or lube that Pass
<b>Gulf of Mexico</b>								
shallow	(51% GOM wells) =	51.00%						
shallow, no lube	(51% * 88% all wells) =		44.88%					
shallow, no lube, no spot	(44.88% * 78% all wells do not use spot) =			35.01%	1.0%	0.350%	34.66%	
shallow, no lube, + spot	(44.88% * 22% all wells need spot) =			9.87%	33.0%	3.258%	6.62%	
shallow, + lube	(51% * 12% all wells) =		6.12%					
shallow, + lube, no spot	(6.12% * 78% all wells do not use spot) =			4.77%	33.0%	1.575%	3.20%	
shallow, + lube, + spot	(6.12% * 22% all wells need spot) =			1.35%	56.0%	0.754%	0.59%	10.41%
total % shallow wells						5.940%	45.06%	
deep	(49% GOM wells) =	49.00%						
deep, OBF (no discharge)	(15% of deep wells) =	7.35%			100%	7.35%	0.00%	
deep, WBF (discharge)	(85% of deep wells) =	41.65%						
deep, no lube	(49% * 88% all wells) =		36.65%					
deep, no lube, no spot	(43.12% * 78% all wells do not use spot) =			28.59%	1.0%	0.286%	28.30%	
deep, no lube, + spot	(43.12% * 22% all wells need spot) =			8.06%	33.0%	2.661%	5.40%	
deep, + lube	(49% * 12% all wells) =		5.00%					
deep, + lube, no spot	(6.12% * 78% all wells do not use spot) =			3.90%	33.0%	1.286%	2.61%	
deep, + lube, + spot	(6.12% * 22% all wells need spot) =			1.10%	56.0%	0.616%	0.48%	8.50%
total % deep wells			41.65%	41.65%		12.20%	36.80%	
<b>California</b>								
shallow	(58% CA wells) =	58.00%						
shallow, no lube	(58% * 88% all wells) =		51.04%					
shallow, no lube, no spot	(51.04% * 78% all wells do not use spot) =			39.81%	1.0%	0.398%	39.41%	
shallow, no lube, + spot	(51.04% * 22% all wells need spot) =			11.23%	33.0%	3.706%	7.52%	
shallow, + lube	(58% * 12% all wells) =		6.96%					
shallow, + lube, no spot	(6.96% * 78% all wells do not use spot) =			5.43%	33.0%	1.792%	3.64%	
shallow, + lube, + spot	(6.96% * 22% all wells need spot) =			1.53%	56.0%	0.857%	0.67%	11.83%
total % shallow wells						6.753%	51.25%	
deep	(42% CA wells) =	42.00%						
deep, OBF (no discharge)	(15% of deep wells) =	6.30%			100%	6.30%	0.00%	
deep, WBF (discharge)	(85% of deep wells) =	35.70%						
deep, no lube	(42% * 88% all wells) =		31.42%					
deep, no lube, no spot	(36.96% * 78% all wells do not use spot) =			24.50%	1.0%	0.245%	24.26%	
deep, no lube, + spot	(36.96% * 22% all wells need spot) =			6.91%	33.0%	2.281%	4.63%	
deep, + lube	(42% * 12% all wells) =		4.28%					
deep, + lube, no spot	(3.93% * 78% all wells do not use spot) =			3.34%	33.0%	1.103%	2.24%	
deep, + lube, + spot	(3.93% * 22% all wells need spot) =			0.94%	56.0%	0.528%	0.41%	7.28%
total % deep wells			35.70%	35.70%		10.46%	31.54%	
<b>Alaska</b>								
shallow	(41% AK wells) =	41.00%						
shallow, no lube	(41% * 88% all wells) =		36.08%					
shallow, no lube, no spot	(36.08% * 78% all wells do not use spot) =			28.14%	1.0%	0.281%	27.86%	
shallow, no lube, + spot	(36.08% * 22% all wells need spot) =			7.94%	33.0%	2.619%	5.32%	
shallow, + lube	(41% * 12% all wells) =		4.92%					
shallow, + lube, no spot	(4.92% * 78% all wells do not use spot) =			3.84%	33.0%	1.266%	2.57%	
shallow, + lube, + spot	(4.92% * 22% all wells need spot) =			1.08%	56.0%	0.606%	0.48%	8.37%
total % shallow wells						4.773%	36.23%	
deep	(59% AK wells) =	59.00%						
deep, OBF (no discharge)	(15% of deep wells) =	8.85%			100%	8.85%	0.00%	
deep, WBF (discharge)	(85% of deep wells) =	50.15%						
deep, no lube	(59% * 88% all wells) =		44.13%					
deep, no lube, no spot	(51.92% * 78% all wells do not use spot) =			34.42%	1.0%	0.344%	34.08%	
deep, no lube, + spot	(51.92% * 22% all wells need spot) =			9.71%	33.0%	3.204%	6.51%	
deep, + lube	(59% * 12% all wells) =		6.02%					
deep, + lube, no spot	(7.08% * 78% all wells do not use spot) =			4.69%	33.0%	1.549%	3.15%	
deep, + lube, + spot	(7.08% * 22% all wells need spot) =			1.32%	56.0%	0.741%	0.58%	10.23%
total % deep wells			50.15%	50.15%		14.69%	44.31%	

(a) Percentage Distribution of Water-based Drilling Fluid Types, (no oil, +MO lube, +MO spot, or +MO lube & spot)

(b) Cells shaded in blue are data input from ODD: Table XI-10, p XI-17; other percentages shown are derived from these input values)

(c) The terms "shallow" and "deep" as used in the offshore effluent limitation guideline do NOT have the same meaning as the same terms as used in the synthetics effluent guideline; these terms in the offshore rule refers to the relative target depth of the well, whereas in the synthetics rule they refer to the water depth in which operations occur.

**WORKSHEET No. C:**
**POLLUTANT LOADINGS FROM WATER-BASED DRILLING FLUID: WELL DEPTHS AND VOLUMES OF DISCHARGED CUTTINGS AND DRILLING FLUIDS**

		GOM	CA	AK	GOM	CA	AK
		Shallow Well			Deep Well		
( from ODD: Table XI-2, p XI-4)	well depth, TD	10,559	7,607	10,633	13,037	10,082	12,354
	cuttings discharged , bbl per well	1,475	1,242	1,480	2,458	1,437	2,413
( from ODD: Table XI-2, p XI-4)	drilling fluids (bbl) per well	6,938	5,939	6,963	9,752	6,777	9,458

**Current Well Counts, SBF Effluent Limitations Guideline (see "Well Count Input Sheet," this file)**

Est'd % WBF > SBF	EXISTING SOURCES, WBF Wells				NEW SOURCES, WBF Wells				Total
	GOM	CA	AK	Subtotal	GOM	CA	AK	Subtotal	
Baseline 0%	857.0	5	4	866	38	0	0	38	904
BAT 1 6%	803.0	5	4	812	35	0	0	35	847
BAT 2 6%	803.0	5	4	812	35	0	0	35	847

**WBF/Water Phase Composition/Contribution to Toxic/Non-conventional Pollutant Loadings, Offshore Record**

( from ODD: Table XI-3, p XI-5 and Table XI-6, p XI-9)

(fromODD, p XI-6)

Drilling Fluids	Composition, lbs/bbl	Total nonC+toxics+Ba
barite	98	384,792 mg/kg dry
kg/bbl tox+non-Conv		17.1 kg/bbl
lb/bbl tox+non-Conv		37.7 lb/bbl
mineral oil	9	2.9 lb/bbl
TSS	153	153.0 lb/bbl

Cuttings	
Density	543 lbs/bbl
Adherent mud 5.0%	
Mud TSS 153	lb/bbl
Ad'nt mud TSS 7.7	lb/bbl
Total TSS per bbl cuttings	551 lb/bbl

**WBF/ Mineral Oil Phase Contribution to Toxic/Non-conventional Pollutant Loadings**

( from ODD: Table XI-5, p XI-7)

MO (9 lb/bbl)	30.51 mg nonconventionals/ml MO:	0.14700 kg/bbl	non-conventional = 99.8%
	0.05 mg toxics/ml MO,	0.00024 kg/bbl	toxics = 0.2%
kg toxic+Non-conventional Pollutants per bbl MO		0.147 kg/bbl	
lbs toxic + Non-conventional Pollutants per bbl MO		0.324 lb/bbl	

461 : b/bbl mud  
 11.0 : lb/gal mud  
 2.1 : gal of 5% mud  
 23.1 : wt of 5% mud  
 543 : lb/bbl cuttings  
 566 : lb/bbl wet cuttings

**WORKSHEET No. D:**

**POLLUTANT LOADINGS FROM WATER-BASED DRILLING FLUIDS: CONVENTIONAL POLLUTANTS FROM ZERO DISCHARGE CUTTINGS  
(INJECTED ONSITE OR HAULED FOR ONSHORE DISPOSAL) DUE TO PROJECTED SHEEN OR TOXICITY TEST FAILURES, EXISTING SOURCES**

POLLUTANTS FROM CUTTINGS HAULED OR INJECTED (Conventional)		Shallow Well			Deep Well			Totals
( from ODD: Table XI-2, p XI-4)		GOM	CA	AK	GOM	CA	AK	
well depth, TD		10,559	7,607	10,633	13,037	10,082	12,354	
no. wells , total by region (from Exh. 2)		857	5	4	857	5	4	866
% WBF (total - OBF) wells failing permit limits (from Exh. 1)		5.94%	6.75%	4.77%	4.85%	4.16%	5.84%	
No. WBF wells zero discharge cuttings		51	0	0	42	0	0	93
Cuttings (bbl) per well		1,475	1,242	1,480	2,458	1,437	2,413	
<b>CUTTINGS TSS ANALYSIS:</b>								
lbs TSS / bbl (from Exh. 3)		551	551	551	551	551	551	
lbs TSS per well		812,209	683,907	814,962	1,353,498	791,284	1,328,718	
total lbs TSS		41,349,547	-	-	56,846,903	-	-	98,196,451
Gulf of Mexico								98,196,451
California								-
Alaska								-
total volume cuttings, bbl		75,092	-	-	103,236	-	-	178,328
Gulf of Mexico								178,328
California								-
Alaska								-
<b>CUTTINGS OIL ANALYSIS:</b>								
% wells , by type and region (from Exh. 1)		51.00%	58.00%	41.00%	49.00%	42.00%	59.00%	
total no. wells, by region (from Exh. 2)		857	5	4	857	5	4	
no. wells, by type and region		437	3	2	420	2	2	866
% wells using MO spot or lube, zero discharge		5.59%	6.75%	4.77%	4.56%	4.16%	5.84%	
no. wells zero discharge		48	0	0	39	0	0	87
cuttings per well, bbl		1,475	1,242	1,480	2,458	1,437	2,413	
fraction adherent fluid		5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	
volume adherent fluid, per well, bbl		74.0	62	74	123	72	121	
MO, lbs per bbl		9	9	9	9	9	9	
MO, lbs per well		666	558	666	1,107	648	1,089	
total lbs MO		31,968	-	-	43,173	-	-	75,141
Gulf of Mexico								75,141
California								-
Alaska								-
total volume MO, bbl		3,552	-	-	4,797	-	-	8,349
Gulf of Mexico								8,349
California								-
Alaska								-
<b>TOTAL CONVENTIONAL POLLUTANTS</b>								
lbs conventional pollutants zero discharge		41,381,515	-	-	56,890,076	-	-	98,271,592
Gulf of Mexico								98,271,592
California								-
Alaska								-
% injected onsite	onsite	20%	20%	100%	0%	0%	100%	
% hauled onshore	onshore	80%	80%	0%	100%	100%	0%	
lbs pollutants injected		8,276,303	-	-	-	-	-	8,276,303
lbs pollutants disposed onshore		33,105,212	-	-	56,890,076	-	-	89,995,289
Gulf of Mexico	injected onsite							8,276,303
California	injected onsite							-
Alaska	injected onsite							-
Gulf of Mexico	disposed onshore							89,995,289
California	disposed onshore							-
Alaska	disposed onshore							-
bbl conventional pollutants zero discharged		78,644	-	-	108,033	-	-	186,677
Gulf of Mexico	injected onsite							15,729
California	injected onsite							-
Alaska	injected onsite							-
Gulf of Mexico	disposed onshore							170,948
California	disposed onshore							-
Alaska	disposed onshore							-

**WORKSHEET No. E:**
**POLLUTANT LOADINGS FROM WATER-BASED DRILLING FLUIDS: CONVENTIONAL POLLUTANTS FROM DRILLING FLUIDS ZERO DISCHARGED  
(INJECTED ONSITE OR HAULED FOR ONSHORE DISPOSAL) DUE TO PROJECTED SHEEN OR TOXICITY TEST FAILURES,EXISTING SOURCES**

POLLUTANTS FROM DRILLING FLUIDS HAULED OR INJECTED (Conventional)			Shallow Well			Deep Well			Totals	
( from ODD: Table XI-2, p XI-4)			GOM	CA	AK	GOM	CA	AK		
Well Depth, TD			10,559	7,607	10,633	13,037	10,082	12,354		
No. wells , total			857	5	4	857	5	4	866	
No. wells hauling fluids			51	0	0	42	0	0	93	
Drilling fluids (bbl) per well			6,938	5,939	6,963	9,752	6,777	9,458		
<b>WB FLUIDS TSS ANALYSIS:</b>										
lbs TSS / bbl			153	153	153	153	153	153		
lbs TSS per well			1,061,514	908,667	1,065,339	1,492,056	1,036,881	1,447,074		
total lbs TSS			54,041,678	-	-	62,666,352	-	-	116,708,030	
Gulf of Mexico									116,708,030	
California									-	
Alaska									-	
total volume, bbl, WB fluids			353,214	-	-	409,584	-	-	762,798	
Gulf of Mexico									762,798	
California									-	
Alaska									-	
<b>WB FLUIDS OIL ANALYSIS:</b>										
% wells using MO spot or lube, hauling			5.59%	6.75%	4.77%	4.56%	4.16%	5.84%		
no. wells using hauling			48	-	-	39	-	-	87	
WB fluids discharged per well, bbl			6,938	5,939	6,963	9,752	6,777	9,458		
MO, lbs per bbl			9	9	9	9	9	9	9	
MO, lbs per well			62,442	53,451	62,667	87,768	60,993	85,122	85,122	
total lbs MO			2,997,216	-	-	3,422,952	-	-	6,420,168	
Gulf of Mexico									6,420,168	
California									-	
Alaska									-	
total volume MO, bbl			10,049	-	-	11,476	-	-	21,525	
Gulf of Mexico			482,344	-	-	447,572	-	-	929,916	
California									-	
Alaska									-	
<b>TOTAL CONVENTIONAL POLLUTANTS:</b>										
lbs conventional pollutants zero discharge			57,038,894	-	-	66,089,304	-	-	123,128,198	
Gulf of Mexico									123,128,198	
California									-	
Alaska									-	
% injected onsite			20%	20%	100%	0%	0%	100%		
% hauled onshore			80%	80%	0%	100%	100%	0%		
lbs pollutants injected			11,407,779	-	-	-	-	-	11,407,779	
lbs pollutants disposed onshore			45,631,115	-	-	66,089,304	-	-	111,720,419	
Gulf of Mexico injected onsite									11,407,779	
California injected onsite									-	
Alaska injected onsite									-	
Gulf of Mexico disposed onshore									111,720,419	
California disposed onshore									-	
Alaska disposed onshore									-	
									123,128,198	
bbl conventional pollutants zero discharged			363,262	-	-	421,060	-	-	784,323	
Gulf of Mexico injected onsite									72,652	
California injected onsite									-	
Alaska injected onsite									-	
Alaska disposed onshore									-	



**WORKSHEET No. F:**
**POLLUTANT LOADINGS FROM WATER-BASED DRILLING FLUID: TOXIC/NON-CONVENTIONAL POLLUTANTS FROM ZERO DISCHARGE  
DRILLING FLUIDS (INJECTED ONSITE OR HAULED FOR ONSHORE DISPOSAL) DUE TO SHEEN/TOXICITY TEST FAILURES, EXISTING SOURCES**

POLLUTANTS FROM DISCHARGED DRILLING FLUIDS (Toxics & Non-conventionals)			Shallow Well			Deep Well			Totals	
TOXICS HAULED			GOM	CA	AK	GOM	CA	AK		
( from ODD: Table XI-2, p XI-4)										
Well Depth, TD			10,559	7,607	10,633	13,037	10,082	12,354		
No. wells , total			857	5	4	857	5	4	866	
No. wells discharging cuttings			51	0	0	42	0	0	93	
Drilling fluidsDischarged (bbl) per well			6,938	5,939	6,963	9,752	6,777	9,458		
<b>WB FLUIDS TOXICS/NON-CONVENTIONALS:</b>										
lbs toxics/non-conventionals/ bbl (from Exh. 3)			37.7	37.7	37.7	37.7	37.7	37.7		
lbs toxics/non-conventionals per well			261,629	223,957	262,572	367,744	255,558	356,657		
total lbs toxics/non-conventionals			13,319,531	-	-	15,445,235	-	-	28,764,766	
Gulf of Mexico									28,764,766	
California									-	
Alaska									-	
total volume, bbl, WB fluids			353,214	-	-	409,584	-	-	762,798	
Gulf of Mexico									762,798	
California									-	
Alaska									-	
<b>WB FLUIDS MINERAL OIL TOXICS/NON-CONVENTIONALS:</b>										
% wells using MO spot or lube, discharging (from Exh. 1)			5.59%	0.00%	0.00%	0.00%	0.00%	0.00%		
no. wells using MO and discharging (from Exh. 5A)			48	-	-	39	-	-	87	
WB fluids discharged per well, bbl			6,938	5,939	6,963	9,752	6,777	9,458		
mineral oil toxics, lb / bbl (from Exh. 3)			0.324	0.324	0.324	0.324	0.324	0.324		
mineral oil toxics, lbs / well			2,247	1,924	2,256	3,159	2,195	3,064	14,845	
total lbs mineral oil toxics			107,876	-	-	123,199	-	-	231,075	
Gulf of Mexico									231,075	
California									-	
Alaska									-	
total volume MO, bbl			362	-	-	413	-	-	775	
Gulf of Mexico			17,361	-	-	16,109	-	-	33,470	
California									-	
Alaska									-	
<b>TOTAL TOXIC/NON-CONVENTIONAL POLLUTANTS:</b>										
lbs conventional pollutants discharged			13,427,407	-	-	15,568,434	-	-	28,995,841	
Gulf of Mexico									28,995,841	
California									-	
Alaska									-	
% injected onsite			20%	20%	100%	0%	0%	100%		
% hauled onshore			80%	80%	0%	100%	100%	0%		
lbs pollutants injected			2,685,481	-	-	-	-	-	2,685,481	
lbs pollutants disposed onshore			10,741,926	-	-	15,568,434	-	-	26,310,360	
Gulf of Mexico injected onsite									2,685,481	
California injected onsite									-	
Alaska injected onsite									-	
Gulf of Mexico disposed onshore									26,310,360	
California disposed onshore									-	
Alaska disposed onshore									-	
bbl conventional pollutants discharged			353,575	-	-	409,997	-	-	763,572	
Gulf of Mexico injected onsite									70,715	
California injected onsite									-	
Alaska injected onsite									-	
Gulf of Mexico disposed onshore									692,857	
California disposed onshore									-	
Alaska disposed onshore									-	

**WORKSHEET G:****Baseline (WBF) Existing Sources - Lower Bound WBF Failure Rate (0%)**

Summary of Total Baseline Water-Based Fluids Onsite Discharge and Zero Discharge/Onshore Disposal Loadings					
		GOM	CA	AK	Total
ONSITE DISCHARGE: Loadings, Cuttings	Conventionals	838,205,767	3,634,290	3,472,399	845,312,456
ONSITE DISCHARGE: Loadings, Fluids	Conventionals	1,008,839,780	4,799,763	3,959,487	1,017,599,030
	Toxics + Non-conventionals	246,038,746	1,182,987	975,886	248,197,619
	Total Drilling Fluids	1,254,878,526	5,982,750	4,935,373	1,265,796,649
<b>TOTAL ONSITE DISCHARGE LOADINGS</b>		<b>2,093,084,293</b>	<b>9,617,040</b>	<b>8,407,772</b>	<b>2,111,109,104</b>
ZD/ONSHORE DISPOSAL: Loadings, Cuttings	Conventionals	-	-	-	-
ZD/ONSHORE DISPOSAL: Loadings, Fluids	Conventionals	-	-	-	-
	Toxics + Non-conventionals	-	-	-	-
	Total Drilling Fluids	-	-	-	-
<b>TOTAL ZD/ONSHORE DISPOSAL LOADINGS</b>		<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
	Onsite Injection	-	-	-	-
	Haul/Onshore Disposal	-	-	-	-
<b>TOTAL ONSITE AND ZD/ONSHORE BASELINE WBF POLLUTANT LOADINGS</b>		<b>2,093,084,293</b>	<b>9,617,040</b>	<b>8,407,772</b>	<b>2,111,109,104</b>

**BAT 1 & 2 (WBF) Existing Sources - Lower Bound WBF Failure Rate (0%)**

Summary of Total Baseline Water-Based Fluids Onsite Discharge and Zero Discharge/Onshore Disposal Loadings					
		GOM	CA	AK	Total
ONSITE DISCHARGE: Loadings, Cuttings	Conventionals	786,319,752	3,634,290	3,472,399	793,426,441
ONSITE DISCHARGE: Loadings, Fluids	Conventionals	946,379,702	4,799,763	3,959,487	955,138,952
	Toxics + Non-conventionals	230,802,429	1,182,987	975,886	232,961,301
	Total Drilling Fluids	1,177,182,130	5,982,750	4,935,373	1,188,100,253
<b>TOTAL ONSITE DISCHARGE LOADINGS</b>		<b>1,963,501,883</b>	<b>9,617,040</b>	<b>8,407,772</b>	<b>1,981,526,694</b>
ZD/ONSHORE DISPOSAL: Loadings, Cuttings	Conventionals	-	-	-	-
ZD/ONSHORE DISPOSAL: Loadings, Fluids	Conventionals	-	-	-	-
	Toxics + Non-conventionals	-	-	-	-
	Total Drilling Fluids	-	-	-	-
<b>TOTAL ZD/ONSHORE DISPOSAL LOADINGS</b>		<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
	Onsite Injection	-	-	-	-
	Haul/Onshore Disposal	-	-	-	-
<b>TOTAL ONSITE AND ZD/ONSHORE BASELINE WBF POLLUTANT LOADINGS</b>		<b>1,963,501,883</b>	<b>9,617,040</b>	<b>8,407,772</b>	<b>1,981,526,694</b>

**WORKSHEET G:**

**BAT 3 (WBF) Existing Sources - Lower Bound WBF Failure Rate (0%)**

Summary of Total Baseline Water-Based Fluids Onsite Discharge and Zero Discharge/Onshore Disposal Loadings					
		GOM	CA	AK	Total
ONSITE DISCHARGE: Loadings, Cuttings	Conventionals	858,659,743	3,634,290	3,472,399	865,766,432
ONSITE DISCHARGE: Loadings, Fluids	Conventionals	1,033,437,358	4,799,763	3,959,487	1,042,196,608
	Toxics + Non-conventionals	252,024,882	1,182,987	975,886	254,183,755
	Total Drilling Fluids	1,285,462,241	5,982,750	4,935,373	1,296,380,363
TOTAL ONSITE DISCHARGE LOADINGS		2,144,121,984	9,617,040	8,407,772	2,162,146,796
ZD/ONSHORE DISPOSAL: Loadings, Cuttings	Conventionals	-	-	-	-
ZD/ONSHORE DISPOSAL: Loadings, Fluids	Conventionals	-	-	-	-
	Toxics + Non-conventionals	-	-	-	-
	Total Drilling Fluids	-	-	-	-
TOTAL ZD/ONSHORE DISPOSAL LOADINGS		-	-	-	-
		Onsite Injection	-	-	-
		Haul/Onshore Disposal	-	-	-
TOTAL ONSITE AND ZD/ONSHORE BASELINE WBF POLLUTANT LOADINGS		2,144,121,984	9,617,040	8,407,772	2,162,146,796

**DISCHARGE S >>>**

-	2,111,109,104	total toxic/non-conv: baseline	248,197,619	total conventionals: baseline	1,862,911,486
-	1,981,526,694	BAT 1 & 2	232,961,301	BAT 1 & 2	1,748,565,393
-	2,162,146,796	BAT 3	254,183,755	BAT 3	1,907,963,040
		Incr BAT 1 & 2	(15,236,318)	Incr BAT 1 & 2	(114,346,092)
		Incr BAT 3	5,986,136	Incr BAT 3	45,051,555

**WORKSHEET H:**
**Baseline (WBF) Existing Sources - Upper Bound WBF Failure Rate (10.73%)**

Summary of Total Baseline Water-Based Fluids Onsite Discharge and Zero Discharge/Onshore Disposal Loadings					
		GOM	CA	AK	Total
ONSITE DISCHARGE: Loadings, Cuttings	Conventionals	739,934,175	3,634,290	3,472,399	747,040,864
ONSITE DISCHARGE: Loadings, Fluids	Conventionals	885,711,582	4,799,763	3,959,487	894,470,832
	Toxics + Non-conventionals	217,042,905	1,182,987	975,886	219,201,778
	Total Drilling Fluids	1,102,754,487	5,982,750	4,935,373	1,113,672,610
TOTAL ONSITE DISCHARGE LOADINGS		1,842,688,662	9,617,040	8,407,772	1,860,713,474
ZD/ONSHORE DISPOSAL: Loadings, Cuttings	Conventionals	98,271,592	-	-	98,271,592
ZD/ONSHORE DISPOSAL: Loadings, Fluids	Conventionals	123,128,198	-	-	123,128,198
	Toxics + Non-conventionals	28,995,841	-	-	28,995,841
	Total Drilling Fluids	152,124,039	-	-	152,124,039
TOTAL ZD/ONSHORE DISPOSAL LOADINGS		250,395,631	-	-	250,395,631
	Onsite Injection	22,369,563	-	-	22,369,563
	Haul/Onshore Disposal	228,026,068	-	-	228,026,068
TOTAL ONSITE AND ZD/ONSHORE BASELINE WBF POLLUTANT LOADINGS		2,093,084,293	9,617,040	8,407,772	2,111,109,104

**BAT 1 & 2 (WBF) Existing Sources - Upper Bound WBF Failure Rate (10.73%)**

Summary of Total Baseline Water-Based Fluids Onsite Discharge and Zero Discharge/Onshore Disposal Loadings					
		GOM	CA	AK	Total
ONSITE DISCHARGE: Loadings, Cuttings	Conventionals	694,720,056	3,634,290	3,472,399	701,826,745
ONSITE DISCHARGE: Loadings, Fluids	Conventionals	831,497,994	4,799,763	3,959,487	840,257,244
	Toxics + Non-conventionals	203,762,708	1,182,987	975,886	205,921,580
	Total Drilling Fluids	1,035,260,702	5,982,750	4,935,373	1,046,178,824
TOTAL ONSITE DISCHARGE LOADINGS		1,729,980,757	9,617,040	8,407,772	1,748,005,569
ZD/ONSHORE DISPOSAL: Loadings, Cuttings	Conventionals	91,599,697	0	0	91,599,697
ZD/ONSHORE DISPOSAL: Loadings, Fluids	Conventionals	114,881,708	0	0	114,881,708
	Toxics + Non-conventionals	27,039,721	0	0	27,039,721
	Total Drilling Fluids	141,921,429	0	0	141,921,429
TOTAL ZD/ONSHORE DISPOSAL LOADINGS		233,521,125	0	0	233,521,125
	Onsite Injection	20,959,454	0	0	20,959,454
	Haul/Onshore Disposal	212,561,671	0	0	212,561,671
TOTAL ONSITE AND ZD/ONSHORE BASELINE WBF POLLUTANT LOADINGS		1,963,501,883	9,617,040	8,407,772	1,981,526,694

WORKSHEET H:

BAT 3 (WBF) Existing Sources - Upper Bound WBF Failure Rate (10.73%)

Summary of Total Baseline Water-Based Fluids Onsite Discharge and Zero Discharge/Onshore Disposal Loadings					
		GOM	CA	AK	Total
ONSITE DISCHARGE: Loadings, Cuttings	Conventionals	758,074,474	3,634,290	3,472,399	765,181,163
ONSITE DISCHARGE: Loadings, Fluids	Conventionals	907,414,308	4,799,763	3,959,487	916,173,558
	Toxics + Non-conventionals	222,347,169	1,182,987	975,886	224,506,042
	Total Drilling Fluids	1,129,761,477	5,982,750	4,935,373	1,140,679,600
TOTAL ONSITE DISCHARGE LOADINGS		1,887,835,951	9,617,040	8,407,772	1,905,860,763
ZD/ONSHORE DISPOSAL: Loadings, Cuttings	Conventionals	100,585,269	-	-	100,585,269
ZD/ONSHORE DISPOSAL: Loadings, Fluids	Conventionals	126,023,050	-	-	126,023,050
	Toxics + Non-conventionals	29,677,713	-	-	29,677,713
	Total Drilling Fluids	155,700,764	-	-	155,700,764
TOTAL ZD/ONSHORE DISPOSAL LOADINGS		256,286,033	-	-	256,286,033
		Onsite Injection	22,886,577	-	22,886,577
		Haul/Onshore Disposal	233,399,455	-	233,399,455
TOTAL ONSITE AND ZD/ONSHORE BASELINE WBF POLLUTANT LOADINGS		2,144,121,984	9,617,040	8,407,772	2,162,146,796

DISCHARGE S >>>	-	1,860,713,474	total toxic/non-conv: baseline	219,201,778	total conventionals: baseline	1,641,511,696
	-	1,748,005,569	BAT 1 & 2	205,921,580	BAT 1 & 2	1,542,083,989
	-	1,905,860,763	BAT 3	224,506,042	BAT 3	1,681,354,721
			Incr BAT 1 & 2	(13,280,197)	Incr BAT 1 & 2	(99,427,707)
			Incr BAT 3	5,304,264	Incr BAT 3	39,843,025

**WORKSHEET AA: SUMMARY OF EXISTING SOURCE DRILLING FLUID DISPOSAL LOADINGS BY REGION, OPTION, FLUID TYPE, AND LOCATION**  
**Gulf of Mexico -- Lower Failure Rate**

		Onsite Discharge	Zero Discharge Alternative Disposal Methods		Total Media Pollutant Loadings	Net Loadings (Reductions), lbs		
			Onsite Injection	Haul/ Onshore Disposal		Onsite (marine) Discharges	Onshore Disposal	All Media Totals
Baseline	wbf	2,093,084,293	0	0	2,093,084,293			
	sbf	237,890,828	0	0	237,890,828			
	obf	0	11,862,178	47,448,711	59,310,889			
	total	2,330,975,121	11,862,178	47,448,711	2,390,286,010			
BAT 1	wbf	1,963,501,883	0	0	1,963,501,883			
	sbf	259,628,314	0	0	259,628,314			
	obf	0	7,092,172	28,368,689	35,460,861			
	total	2,223,130,197	7,092,172	28,368,689	2,258,591,058			
BAT 2	wbf	1,963,501,883	0	0	1,963,501,883			
	sbf	252,066,749	0	7,561,565	259,628,314			
	obf	0	7,092,172	28,368,689	35,460,861			
	total	2,215,568,632	7,092,172	35,930,254	2,258,591,058			
BAT 3	wbf	2,144,121,984	0	0	2,144,121,984			
	sbf	0	0	19,766,219	19,766,219			
	obf	0	36,101,236	204,866,907	240,968,143			
	total	2,144,121,984	36,101,236	224,633,126	2,404,856,346			
						-107,844,924	-23,850,028	-131,694,952
						-115,406,489	-16,288,463	-131,694,952
						-186,853,137	201,423,473	14,570,336

**California -- Lower Failure Rate**

		Onsite Discharge	Zero Discharge Alternative Disposal Methods		Total Media Pollutant Loadings	Net Loadings (Reductions), lbs		
			Onsite Injection	Haul/ Onshore Disposal		Onsite (marine) Discharges	Onshore Disposal	All Media Totals
Baseline	wbf	9,617,040	0	0	9,617,040			
	sbf	0	0	0	0			
	obf	0	1,945,148	0	1,945,148			
	total	9,617,040	1,945,148	0	11,562,188			
BAT 1	wbf	9,617,040	0	0	9,617,040			
	sbf	0	0	0	0			
	obf	0	1,945,148	0	1,945,148			
	total	9,617,040	1,945,148	0	11,562,188			
BAT 2	wbf	9,617,040	0	0	9,617,040			
	sbf	0	0	0	0			
	obf	0	1,945,148	0	1,945,148			
	total	9,617,040	1,945,148	0	11,562,188			
BAT 3	wbf	9,617,040	0	0	9,617,040			
	sbf	0	0	0	0			
	obf	0	1,945,148	0	1,945,148			
	total	9,617,040	1,945,148	0	11,562,188			
						0	0	-
						0	0	-
						0	0	-

**WORKSHEET AA: SUMMARY OF EXISTING SOURCE DRILLING FLUID DISPOSAL LOADINGS BY REGION, OPTION, FLUID TYPE, AND LOCATION**
**Cook Inlet, Alaska -- Lower Failure Rate**

	Onsite Discharge	Zero Discharge Alternative Disposal Methods		Total Media Pollutant Loadings	Net Loadings (Reductions), lbs		
		Onsite Injection	Haul/ Onshore Disposal		Onsite (marine) Discharges	Onshore Disposal	All Media Totals
Baseline	wbf	8,407,772	0	0	8,407,772		
	sbfbf	0	0	0	0		
	obf	0	1,945,148	0	1,945,148		
	total	8,407,772	1,945,148	0	10,352,920		
BAT 1	wbf	8,407,772	0	0	8,407,772		
	sbfbf	552,796	0	0	552,796		
	obf	0	1,316,784	0	1,316,784		
	total	8,960,568	1,316,784	0	10,277,352	552,796	-628,364
BAT 2	wbf	8,407,772	0	0	8,407,772		
	sbfbf	536,696	16,100	0	552,796		
	obf	0	1,316,784	0	1,316,784		
	total	8,944,468	1,332,884	0	10,277,352	536,696	-612,264
BAT 3	wbf	8,407,772	0	0	8,407,772		
	sbfbf	0	0	0	0		
	obf	0	1,945,148	0	1,945,148		
	total	8,407,772	1,945,148	0	10,352,920	0	0

**TOTAL -- Lower Failure Rate**

	Onsite Discharge	Zero Discharge Alternative Disposal Methods		Total Media Pollutant Loadings	Net Loadings (Reductions), lbs		
		Onsite Injection	Haul/ Onshore Disposal		Onsite (marine) Discharges	Onshore Disposal	All Media Totals
Baseline	wbf	2,111,109,104	0	0	2,111,109,104		
	sbfbf	237,890,828	0	0	237,890,828		
	obf	0	15,752,474	47,448,711	63,201,185		
	total	2,348,999,932	15,752,474	47,448,711	2,412,201,117		
BAT 1	wbf	1,981,526,694	0	0	1,981,526,694		
	sbfbf	260,181,110	0	0	260,181,110		
	obf	0	10,354,104	28,368,689	38,722,793		
	total	2,241,707,804	10,354,104	28,368,689	2,280,430,597	-107,292,128	-24,478,392
BAT 2	wbf	1,981,526,694	0	0	1,981,526,694		
	sbfbf	252,603,445	16,100	7,561,565	260,181,110		
	obf	0	10,354,104	28,368,689	38,722,793		
	total	2,234,130,139	10,370,204	35,930,254	2,280,430,597	-114,869,793	-16,900,727
BAT 3	wbf	2,162,146,796	0	0	2,162,146,796		
	sbfbf	0	0	19,766,219	19,766,219		
	obf	0	39,991,532	204,866,907	244,858,439		
	total	2,162,146,796	39,991,532	224,633,126	2,426,771,454	-186,853,137	201,423,473

**WORKSHEET AA: SUMMARY OF EXISTING SOURCE DRILLING FLUID DISPOSAL LOADINGS BY REGION, OPTION, FLUID TYPE, AND LOCATION**

INCREMENTAL LOADINGS (REDUCTIONS)		Existing Sources			
		Onsite Discharge	Zero Discharge Alternative Disposal Methods		Total Media Pollutant Loadings
			Onsite Injection	Haul/ Onshore Disposal	
Baseline					
	wbf				
	sbf				
	obf				
	total				
BAT 1					
	wbf	-129,582,410	0	0	-129,582,410
	sbf	22,290,282	0	0	22,290,282
	obf	0	-5,398,370	-19,080,022	-24,478,392
	total	-107,292,128	-5,398,370	-19,080,022	-131,770,520
BAT 2					
	wbf	-129,582,410	0	0	-129,582,410
	sbf	14,712,617	16,100	7,561,565	22,290,282
	obf	0	-5,398,370	-19,080,022	-24,478,392
	total	-114,869,793	-5,382,270	-11,518,457	-131,770,520
BAT 3					
	wbf	51,037,691	0	0	51,037,691
	sbf	-237,890,828	0	19,766,219	-218,124,609
	obf	0	24,239,058	157,418,196	181,657,254
	total	-186,853,137	24,239,058	177,184,415	14,570,336

SUMMARY TOTAL LOADINGS (REDUCTIONS)			Existing Sources		
		Onsite Discharge	Zero Discharge Alternative Disposal Methods		Total Media Pollutant Loadings
			Onsite Injection	Haul/ Onshore Disposal	
Baseline	total	2,348,999,932	15,752,474	47,448,711	2,412,201,117
BAT 1	total	2,241,707,804	10,354,104	28,368,689	2,280,430,597
BAT 2	total	2,234,130,139	10,370,204	35,930,254	2,280,430,597
BAT 3	total	2,162,146,796	39,991,532	224,633,126	2,426,771,454

SUMMARY INCREMENTAL LOADINGS (REDUCTIONS)					Existing Sources
		Onsite Discharge	Zero Discharge Alternative Disposal Methods		Total Media
			Onsite Injection	Haul/ Onshore Disposal	Pollutant Loadings
Baseline		NA	NA	NA	NA
BAT 1	total	-107,292,128	-5,398,370	-19,080,022	-131,770,520
BAT 2	total	-114,869,793	-5,382,270	-11,518,457	-131,770,520
BAT 3	total	-186,853,137	24,239,058	177,184,415	14,570,336



**WORKSHEET No. I:**
**POLLUTANT LOADINGS FROM WATER-BASED DRILLING FLUIDS: CONVENTIONAL POLLUTANTS FROM ZERO DISCHARGE CUTTINGS,  
(INJECTED ONSITE OR HAULED FOR ONSHORE DISPOSAL) DUE TO PROJECTED SHEEN OR TOXICITY TEST FAILURES, NEW SOURCES**

POLLUTANTS FROM CUTTINGS HAULED OR INJECTED (Conventional)			Shallow Well			Deep Well			Totals
			GOM	CA	AK	GOM	CA	AK	
( from ODD: Table XI-2, p XI-4)									
well depth, TD			10,559	7,607	10,633	13,037	10,082	12,354	
no. wells, total by region (from Exh. 2)			38	-	-	38	-	-	38
% WBF (total - OBF) wells failing permit limits (from Exh. 1)			5.94%	6.75%	4.77%	4.85%	4.16%	5.84%	
No. WBF wells zero discharge cuttings			2	0	0	2	0	0	4
Cuttings (bbl) per well			1,475	1,242	1,480	2,458	1,437	2,413	
<b>CUTTINGS TSS ANALYSIS:</b>									
lbs TSS / bbl (from Exh. 3)			551	551	551	551	551	551	
lbs TSS per well			812,209	683,907	814,962	1,353,498	791,284	1,328,718	
<b>total lbs TSS</b>			<b>1,624,418</b>	<b>0</b>	<b>0</b>	<b>2,706,995</b>	<b>0</b>	<b>0</b>	<b>4,331,413</b>
Gulf of Mexico									4,331,413
California									-
Alaska									-
total volume cuttings, bbl			<b>2,950</b>	<b>0</b>	<b>0</b>	<b>4,916</b>	<b>0</b>	<b>0</b>	<b>7,866</b>
Gulf of Mexico									7,866
California									-
Alaska									-
<b>CUTTINGS OIL ANALYSIS:</b>									
% wells, by type and region (from Exh. 1)			51.00%	58.00%	41.00%	49.00%	42.00%	59.00%	
total no. wells, by region (from Exh. 2)			38	-	-	38	-	-	
no. wells, by type and region			19	0	0	19	0	0	38
% wells using MO spot or lube, zero discharge			5.59%	6.75%	4.77%	4.56%	4.16%	5.84%	
no. wells zero discharge			2	0	0	2	0	0	4
cuttings per well, bbl			1,475	1,242	1,480	2,458	1,437	2,413	
fraction adherent fluid			5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	
volume adherent fluid, per well, bbl			74.0	62	74	123	72	121	
MO, lbs per bbl			9	9	9	9	9	9	
MO, lbs per well			666	558	666	1,107	648	1,089	
<b>total lbs MO</b>			<b>1,332</b>	<b>0</b>	<b>0</b>	<b>2,214</b>	<b>0</b>	<b>0</b>	<b>3,546</b>
Gulf of Mexico									3,546
California									-
Alaska									-
total volume MO, bbl			<b>148</b>	<b>0</b>	<b>0</b>	<b>246</b>	<b>0</b>	<b>0</b>	<b>394</b>
Gulf of Mexico									394
California									-
Alaska									-
<b>TOTAL CONVENTIONAL POLLUTANTS</b>									
lbs conventional pollutants zero discharge			<b>1,625,750</b>	<b>0</b>	<b>0</b>	<b>2,709,209</b>	<b>0</b>	<b>0</b>	<b>4,334,959</b>
Gulf of Mexico									4,334,959
California									-
Alaska									-
% injected onsite	onsite		20%	20%	100%	0%	0%	100%	
% hauled onshore	onshore		80%	80%	0%	100%	100%	0%	
<b>lbs pollutants injected</b>			<b>325,150</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>325,150</b>
<b>lbs pollutants disposed onshore</b>			<b>1,300,600</b>	<b>0</b>	<b>0</b>	<b>2,709,209</b>	<b>0</b>	<b>0</b>	<b>4,009,809</b>
Gulf of Mexico	injected onsite								325,150
California	injected onsite								-
Alaska	injected onsite								-
Gulf of Mexico	disposed onshore								4,009,809
California	disposed onshore								-
Alaska	disposed onshore								-
bbl conventional pollutants zero discharged			<b>3,098</b>	<b>0</b>	<b>0</b>	<b>5,162</b>	<b>0</b>	<b>0</b>	<b>8,260</b>
Gulf of Mexico	injected onsite								620
California	injected onsite								-
Alaska	injected onsite								-
Gulf of Mexico	disposed onshore								7,640
California	disposed onshore								-
Alaska	disposed onshore								-

**WORKSHEET No. J:**

**POLLUTANT LOADINGS FROM WATER-BASED DRILLING FLUIDS: CONVENTIONAL POLLUTANTS FROM DRILLING FLUIDS ZERO DISCHARGED  
(INJECTED ONSITE OR HAULED FOR ONSHORE DISPOSAL) DUE TO PROJECTED SHEEN OR TOXICITY TEST FAILURES, NEW SOURCES**

POLLUTANTS FROM DRILLING FLUIDS HAULED OR INJECTED (Conventionals)	Shallow Well			Deep Well			Totals	
	GOM	CA	AK	GOM	CA	AK		
( from ODD: Table XI-2, p XI-4)								
Well Depth, TD	10,559	7,607	10,633	13,037	10,082	12,354		
No. wells , total	38	-	-	38	-	-	38	
No. wells hauling fluids	2	0	0	2	0	0	4	
Drilling fluids (bbl) per well	6,938	5,939	6,963	9,752	6,777	9,458		
<b>WB FLUIDS TSS ANALYSIS:</b>								
lbs TSS / bbl	153	153	153	153	153	153		
lbs TSS per well	1,061,514	908,667	1,065,339	1,492,056	1,036,881	1,447,074		
total lbs TSS	2,123,028	-	-	2,984,112	-	-	5,107,140	
Gulf of Mexico							5,107,140	
California							-	
Alaska							-	
total volume, bbl, WB fluids	13,876	-	-	19,504	-	-	33,380	
Gulf of Mexico							33,380	
California							-	
Alaska							-	
<b>WB FLUIDS OIL ANALYSIS:</b>								
% wells using MO spot or lube, hauling	5.59%	6.75%	4.77%	4.56%	4.16%	5.84%		
no. wells using hauling	2	-	-	2	-	-	4	
WB fluids discharged per well, bbl	6,938	5,939	6,963	9,752	6,777	9,458		
MO, lbs per bbl	9	9	9	9	9	9	9	
MO, lbs per well	62,442	53,451	62,667	87,768	60,993	85,122	85,122	
total lbs MO	124,884	-	-	175,536	-	-	300,420	
Gulf of Mexico							300,420	
California							-	
Alaska							-	
total volume MO, bbl	419	-	-	589	-	-	1,007	
Gulf of Mexico	837	-	-	1,177	-	-	2,014	
California							-	
Alaska							-	
<b>TOTAL CONVENTIONAL POLLUTANTS:</b>								
lbs conventional pollutants zero discharge	2,247,912	-	-	3,159,648	-	-	5,407,560	
Gulf of Mexico							5,407,560	
California							-	
Alaska							-	
% injected onsite	20%	20%	100%	0%	0%	100%		
% hauled onshore	80%	80%	0%	100%	100%	0%		
lbs pollutants injected	449,582	-	-	-	-	-	449,582	
lbs pollutants disposed onshore	1,798,330	-	-	3,159,648	-	-	4,957,978	
Gulf of Mexico							449,582	
California							-	
Alaska							-	
Gulf of Mexico							4,957,978	
California							-	
Alaska							-	
bbl conventional pollutants zero discharged	14,295	-	-	20,093	-	-	34,387	
Gulf of Mexico							2,859	
California							-	
Alaska							-	
Alaska							-	

**WORKSHEET No. K:**
**POLLUTANT LOADINGS FROM WATER-BASED DRILLING FLUID: TOXIC/NON-CONVENTIONAL POLLUTANTS FROM ZERO DISCHARGE  
DRILLING FLUIDS (INJECTED ONSITE OR HAULED FOR ONSHORE DISPOSAL) DUE TO SHEEN/TOXICITY TEST FAILURES, NEW SOURCES**

POLLUTANTS FROM DISCHARGED DRILLING FLUIDS (Toxics & Non-conventionals)			Shallow Well			Deep Well			Totals	
TOXICS HAULED (from ODD: Table XI-2, p XI-4)			GOM	CA	AK	GOM	CA	AK		
Well Depth, TD			10,559	7,607	10,633	13,037	10,082	12,354		
No. wells , total			38	-	-	38	-	-	38	
No. wells discharging cuttings			2	0	0	2	0	0	4	
Drilling fluids Discharged (bbl) per well			6,938	5,939	6,963	9,752	6,777	9,458		
<b>WB FLUIDS TOXICS/NON-CONVENTIONALS:</b>										
lbs toxics/non-conventionals/ bbl (from Exh. 3)			37.7	37.7	37.7	37.7	37.7	37.7		
lbs toxics/non-conventionals per well			261,629	223,957	262,572	367,744	255,558	356,657		
total lbs toxics/non-conventionals			523,258	-	-	735,487	-	-	1,258,745	
Gulf of Mexico									1,258,745	
California									-	
Alaska									-	
total volume, bbl, WB fluids			13,876	-	-	19,504	-	-	33,380	
Gulf of Mexico									33,380	
California									-	
Alaska									-	
<b>WB FLUIDS MINERAL OIL TOXICS/NON-CONVENTIONALS:</b>										
% wells using MO spot or lube, discharging (from Exh. 1)			5.59%	0.00%	0.00%	0.00%	0.00%	0.00%		
no. wells using MO and discharging (from Exh. 5A)			2	-	-	2	-	-	4	
WB fluids discharged per well, bbl			6,938	5,939	6,963	9,752	6,777	9,458		
mineral oil toxics, lb / bbl (from Exh. 3)			9.000	9.000	9.000	9.000	9.000	9.000		
mineral oil toxics, lbs / well			62,442	53,451	62,667	87,768	60,993	85,122	412,443	
total lbs mineral oil toxics			124,884	-	-	175,536	-	-	300,420	
Gulf of Mexico									300,420	
California									-	
Alaska									-	
total volume MO, bbl			419	-	-	589	-	-	1,007	
Gulf of Mexico			837	-	-	1,177	-	-	2,014	
California									-	
Alaska									-	
<b>TOTAL TOXIC/NON-CONVENTIONAL POLLUTANTS:</b>										
lbs conventional pollutants discharged			648,142	-	-	911,023	-	-	1,559,165	
Gulf of Mexico									1,559,165	
California									-	
Alaska									-	
% injected onsite			20%	20%	100%	0%	0%	100%		
% hauled onshore			80%	80%	0%	100%	100%	0%		
<b>lbs pollutants injected</b>			129,628	-	-	-	-	-	129,628	
<b>lbs pollutants disposed onshore</b>			518,514	-	-	911,023	-	-	1,429,537	
Gulf of Mexico injected onsite									129,628	
California injected onsite									-	
Alaska injected onsite									-	
Gulf of Mexico disposed onshore									1,429,537	
California disposed onshore									-	
Alaska disposed onshore									-	
bbl conventional pollutants discharged			14,295	-	-	20,093	-	-	34,387	
Gulf of Mexico injected onsite									2,859	
California injected onsite									-	
Alaska injected onsite									-	
Gulf of Mexico disposed onshore									31,528	
California disposed onshore									-	
Alaska disposed onshore									-	

**WORKSHEET L:**
**Baseline (WBF) New Sources - Lower Bound WBF Failure Rate (0%)**

Summary of Total Baseline Water-Based Fluids Onsite Discharge and Zero Discharge/Onshore Disposal Loadings					
		GOM	CA	AK	Total
ONSITE DISCHARGE: Loadings, Cuttings	Conventionals	37,095,021	-	-	37,095,021
ONSITE DISCHARGE: Loadings, Fluids	Conventionals	44,642,502	-	-	44,642,502
	Toxics + Non-conventionals	11,166,082	-	-	11,166,082
	Total Drilling Fluids	55,808,584	-	-	55,808,584
TOTAL ONSITE DISCHARGE LOADINGS		92,903,606	-	-	92,903,606
ZD/ONSHORE DISPOSAL: Loadings, Cuttings	Conventionals	-	-	-	-
ZD/ONSHORE DISPOSAL: Loadings, Fluids	Conventionals	-	-	-	-
	Toxics + Non-conventionals	-	-	-	-
	Total Drilling Fluids	-	-	-	-
TOTAL ZD/ONSHORE DISPOSAL LOADINGS		-	-	-	-
	Onsite Injection	-	-	-	-
	Haul/Onshore Disposal	-	-	-	-
TOTAL ONSITE AND ZD/ONSHORE BASELINE WBF POLLUTANT LOADINGS		92,903,606	-	-	92,903,606

**BAT 1 & 2 (WBF) New Sources - Lower Bound WBF Failure Rate (0%)**

Summary of Total Baseline Water-Based Fluids Onsite Discharge and Zero Discharge/Onshore Disposal Loadings					
		GOM	CA	AK	Total
ONSITE DISCHARGE: Loadings, Cuttings	Conventionals	34,928,208	-	-	34,928,208
ONSITE DISCHARGE: Loadings, Fluids	Conventionals	42,001,164	-	-	42,001,164
	Toxics + Non-conventionals	10,533,551	-	-	10,533,551
	Total Drilling Fluids	52,534,715	-	-	52,534,715
TOTAL ONSITE DISCHARGE LOADINGS		87,462,923	-	-	87,462,923
ZD/ONSHORE DISPOSAL: Loadings, Cuttings	Conventionals	-	-	-	-
ZD/ONSHORE DISPOSAL: Loadings, Fluids	Conventionals	-	-	-	-
	Toxics + Non-conventionals	-	-	-	-
	Total Drilling Fluids	-	-	-	-
TOTAL ZD/ONSHORE DISPOSAL LOADINGS		-	-	-	-
	Onsite Injection	-	-	-	-
	Haul/Onshore Disposal	-	-	-	-
TOTAL ONSITE AND ZD/ONSHORE BASELINE WBF POLLUTANT LOADINGS		87,462,923	-	-	87,462,923

WORKSHEET L:

BAT 3 (WBF) New Sources - Lower Bound WBF Failure Rate (0%)

Summary of Total Baseline Water-Based Fluids Onsite Discharge and Zero Discharge/Onshore Disposal Loadings					
		GOM	CA	AK	Total
ONSITE DISCHARGE: Loadings, Cuttings	Conventionals	40,072,937	-	-	40,072,937
ONSITE DISCHARGE: Loadings, Fluids	Conventionals	48,257,586	-	-	48,257,586
	Toxics + Non-conventionals	12,057,084	-	-	12,057,084
	Total Drilling Fluids	60,314,670	-	-	60,314,670
TOTAL ONSITE DISCHARGE LOADINGS		100,387,607	-	-	100,387,607
ZD/ONSHORE DISPOSAL: Loadings, Cuttings	Conventionals	-	-	-	-
ZD/ONSHORE DISPOSAL: Loadings, Fluids	Conventionals	-	-	-	-
	Toxics + Non-conventionals	-	-	-	-
	Total Drilling Fluids	-	-	-	-
TOTAL ZD/ONSHORE DISPOSAL LOADINGS		-	-	-	-
	Onsite Injection	-	-	-	-
	Haul/Onshore Disposal	-	-	-	-
TOTAL ONSITE AND ZD/ONSHORE BASELINE WBF POLLUTANT LOADINGS		100,387,607	-	-	100,387,607

-	92,903,606	total toxic/non-conv: baseline	11,166,082	total conventionals: baseline	81,737,523
-	87,462,923	BAT 1 & 2	10,533,551	BAT 1 & 2	76,929,372
-	100,387,607	BAT 3	12,057,084	BAT 3	88,330,523
		Incr BAT 1 & 2	(632,532)	Incr BAT 1 & 2	(4,808,151)
		Incr BAT 3	891,002	Incr BAT 3	6,592,999

**WORKSHEET M:****Baseline (WBF) New Sources - Upper Bound WBF Failure Rate (0%)**

<b>Summary of Total Baseline Water-Based Fluids Onsite Discharge and Zero Discharge/Onshore Disposal Loadings</b>					
		<b>GOM</b>	<b>CA</b>	<b>AK</b>	<b>Total</b>
ONSITE DISCHARGE: Loadings, Cuttings	Conventionals	32,760,063	-	-	32,760,063
ONSITE DISCHARGE: Loadings, Fluids	Conventionals	39,234,942	-	-	39,234,942
	Toxics + Non-conventionals	9,606,917	-	-	9,606,917
	Total Drilling Fluids	48,841,859	-	-	48,841,859
<b>TOTAL ONSITE DISCHARGE LOADINGS</b>		<b>81,601,922</b>	<b>-</b>	<b>-</b>	<b>81,601,922</b>
ZD/ONSHORE DISPOSAL: Loadings, Cuttings	Conventionals	4,334,959	-	-	4,334,959
ZD/ONSHORE DISPOSAL: Loadings, Fluids	Conventionals	5,407,560	-	-	5,407,560
	Toxics + Non-conventionals	1,559,165	-	-	1,559,165
	Total Drilling Fluids	6,966,725	-	-	6,966,725
<b>TOTAL ZD/ONSHORE DISPOSAL LOADINGS</b>		<b>11,301,684</b>	<b>-</b>	<b>-</b>	<b>11,301,684</b>
	Onsite Injection	904,361	-	-	904,361
	Haul/Onshore Disposal	10,397,324	-	-	10,397,324
<b>TOTAL ONSITE AND ZD/ONSHORE BASELINE WBF POLLUTANT LOADINGS</b>		<b>92,903,606</b>	<b>-</b>	<b>-</b>	<b>92,903,606</b>

**BAT 1 & 2 (WBF) New Sources - Upper Bound WBF Failure Rate (0%)**

<b>Summary of Total Baseline Water-Based Fluids Onsite Discharge and Zero Discharge/Onshore Disposal Loadings</b>					
		<b>GOM</b>	<b>CA</b>	<b>AK</b>	<b>Total</b>
ONSITE DISCHARGE: Loadings, Cuttings	Conventionals	30,593,249	0	0	30,593,249
ONSITE DISCHARGE: Loadings, Fluids	Conventionals	36,593,604	0	0	36,593,604
	Toxics + Non-conventionals	8,974,385	0	0	8,974,385
	Total Drilling Fluids	45,567,989	0	0	45,567,989
<b>TOTAL ONSITE DISCHARGE LOADINGS</b>		<b>76,161,239</b>	<b>0</b>	<b>0</b>	<b>76,161,239</b>
ZD/ONSHORE DISPOSAL: Loadings, Cuttings	Conventionals	4,334,959	0	0	4,334,959
ZD/ONSHORE DISPOSAL: Loadings, Fluids	Conventionals	5,407,560	0	0	5,407,560
	Toxics + Non-conventionals	1,559,165	0	0	1,559,165
	Total Drilling Fluids	6,966,725	0	0	6,966,725
<b>TOTAL ZD/ONSHORE DISPOSAL LOADINGS</b>		<b>11,301,684</b>	<b>0</b>	<b>0</b>	<b>11,301,684</b>
	Onsite Injection	904,361	0	0	904,361
	Haul/Onshore Disposal	10,397,324	0	0	10,397,324
<b>TOTAL ONSITE AND ZD/ONSHORE BASELINE WBF POLLUTANT LOADINGS</b>		<b>87,462,923</b>	<b>0</b>	<b>0</b>	<b>87,462,923</b>

WORKSHEET M:

BAT 3 (WBF) New Sources - Upper Bound WBF Failure Rate (0%)

Summary of Total Baseline Water-Based Fluids Onsite Discharge and Zero Discharge/Onshore Disposal Loadings					
		GOM	CA	AK	Total
ONSITE DISCHARGE: Loadings, Cuttings	Conventionals	35,737,978	-	-	35,737,978
ONSITE DISCHARGE: Loadings, Fluids	Conventionals	42,850,026	-	-	42,850,026
	Toxics + Non-conventionals	10,497,919	-	-	10,497,919
	Total Drilling Fluids	53,347,945	-	-	53,347,945
TOTAL ONSITE DISCHARGE LOADINGS		89,085,922	-	-	89,085,922
ZD/ONSHORE DISPOSAL: Loadings, Cuttings	Conventionals	4,334,959	-	-	4,334,959
ZD/ONSHORE DISPOSAL: Loadings, Fluids	Conventionals	5,407,560	-	-	5,407,560
	Toxics + Non-conventionals	1,559,165	-	-	1,559,165
	Total Drilling Fluids	6,966,725	-	-	6,966,725
TOTAL ZD/ONSHORE DISPOSAL LOADINGS		11,301,684	-	-	11,301,684
	Onsite Injection	904,361	-	-	904,361
	Haul/Onshore Disposal	10,397,324	-	-	10,397,324
TOTAL ONSITE AND ZD/ONSHORE BASELINE WBF POLLUTANT LOADINGS		100,387,607	-	-	100,387,607

-	81,601,922	total toxic/non-conv: baseline	9,606,917	total conventionals: baseline	71,995,005
-	76,161,239	BAT 1 & 2	8,974,385	BAT 1 & 2	67,186,853
-	89,085,922	BAT 3	10,497,919	BAT 3	78,588,004
		Incr BAT 1 & 2	(632,532)	Incr BAT 1 & 2	(4,808,151)
		Incr BAT 3	891,002	Incr BAT 3	6,592,999

**WORKSHEET BB: NEW SOURCE DRILLING FLUID DISPOSAL LOADINGS BY REGION, OPTION, FLUID TYPE, AND LOCATION**
**Gulf of Mexico -- Lower WBF Failure Rate**

		Onsite Discharge	Zero Discharge Alternative Disposal Method Onsite Injection	haul/ Onshore Disposal	Total Media Pollutant Loadings	Onsite (marine) Discharges	Onshore Disposal	All Media Totals
Baseline	wbf	92,903,606	0	0	92,903,606			
	sbf	17,405,127	0	0	17,405,127			
	obf	0	0	1,256,728	1,256,728			
	total	110,308,733	0	1,256,728	111,565,461			
BAT 1	wbf	87,462,923	0	0	87,462,923			
	sbf	20,241,106	0	0	20,241,106			
	obf	0	0	628,364	628,364			
	total	107,704,029	0	628,364	108,332,393			
BAT 2	wbf	87,462,923	0	0	87,462,923			
	sbf	19,722,488	0	518,618	20,241,106			
	obf	0	0	628,364	628,364			
	total	107,185,411	0	1,146,982	108,332,393			
BAT 3	wbf	100,387,607	0	0	100,387,607			
	sbf	0	0	2,852,661	2,852,661			
	obf	0	879,710	11,125,935	12,005,645			
	total	100,387,607	879,710	13,978,597	115,245,913			
						-2,604,704	-628,364	(3,233,068)
						-3,123,322	-109,746	(3,233,068)
						-9,921,126	13,601,578	3,680,452

**California -- Lower WBF Failure Rate**

		Onsite Discharge	Zero Discharge Alternative Disposal Method Onsite Injection	haul/ Onshore Disposal	Total Media Pollutant Loadings	Onsite (marine) Discharges	Onshore Disposal	All Media Totals
Baseline	wbf							
	sbf							
	obf							
	total							
BAT 1	wbf							
	sbf							
	obf							
	total							
BAT 2	wbf							
	sbf							
	obf							
	total							
BAT 3	wbf							
	sbf							
	obf							
	total							
						0	0	-
						0	0	-
						0	0	-



**Cook Inlet, AK -- Lower WBF Failure Rate**

		Onsite Discharge	Zero Discharge Alternative Disposal Method	Total Media	Onsite (marine) Discharges	Onshore Disposal	All Media Totals
		Onsite Injection	haul/ Onshore Disposal	Pollutant Loadings			
Baseline	wbf						
	sbf						
	obf						
	total						
BAT 1	wbf						
	sbf						
	obf						
	total				0	0	-
BAT 2	wbf						
	sbf						
	obf						
	total				0	0	-
BAT 3	wbf						
	sbf						
	obf						
	total				0	0	-

**Total -- Lower WBF Failure Rate**

Onsite Discharge		Zero Discharge Alternative Disposal Method		Total Media						
		Onsite Injection	Haul/ Onshore Disposal	Pollutant Loadings	Onsite (marine) Discharges	Onshore Disposal	All Media Totals			
Baseline	wbf	92,903,606	0	0	92,903,606					
	sbfbf	17,405,1270	00	01,256,728	17,405,1271,256,728					
	total	110,308,733	0	1,256,728	111,565,461					
BAT 1	wbf	87,462,923	0	0	87,462,923					
	sbfbf	20,241,1060	00	0628,364	20,241,106628,364					
	total	107,704,029	0	628,364	108,332,393			-2,604,704	-628,364	(3,233,068)
BAT 2	wbf	87,462,923	0	0	87,462,923					
	sbfbf	19,722,4880	00	518,618628,364	20,241,106628,364					
	total	107,185,411	0	1,146,982	108,332,393			-3,123,322	-109,746	(3,233,068)
BAT 3	wbf	100,387,607	0	0	100,387,607					
	sbfbf	00	00	2,852,66111,125,935	2,852,66112,005,645					
	total	100,387,607	879,710	13,978,597	115,245,913			-9,921,126	13,601,578	3,680,452

**INCREMENTAL LOADINGS (REDUCTIONS)**
**Lower WBF Failure Rate, New Sources**

INCREMENTAL LOADINGS (REDUCTIONS)		Onsite Discharge	Lower WBF Failure Rate, New Sources		Total Media Pollutant Loadings
			Zero Discharge Alternative Disposal Method	Onsite Injection	
Baseline	wbf				
	sbfi				
	obfi				
	total				
BAT 1	wbf	-5,440,683	0	0	-5,440,683
	sbfi	2,835,979	0	0	2,835,979
	obfi	0	0	-628,364	-628,364
	total	-2,604,704	0	-628,364	-3,233,068
BAT 2	wbf	-5,440,683	0	0	-5,440,683
	sbfi	2,317,361	0	518,618	2,835,979
	obfi	0	0	-628,364	-628,364
	total	-3,123,322	0	-109,746	-3,233,068
BAT 3	wbf	7,484,001	0	0	7,484,001
	sbfi	-17,405,127	0	2,852,661	-14,552,466
	obfi	0	879,710	9,869,207	10,748,917
	total	-9,921,126	879,710	12,721,869	3,680,452

**SUMMARY TOTAL LOADINGS (REDUCTIONS):**
**Lower WBF Failure Rate, New Sources**

		Onsite Discharge	Zero Discharge Alternative Disposal Method		Total Media Pollutant Loadings
			Onsite Injection	haul/ Onshore Disposal	
Baseline	total	110,308,733	0	1,256,728	111,565,461
BAT 1	total	107,704,029	0	628,364	108,332,393
BAT 2	total	107,185,411	0	1,146,982	108,332,393
BAT 3	total	100,387,607	879,710	13,978,597	115,245,913

**SUMMARY INCREMENTAL LOADINGS (REDUCTIONS):**
**Lower WBF Failure Rate, New Sources**

SUMMARY INCREMENTAL LOADINGS (REDUCTIONS):			Lower WDF Failure Rate, New Sources		
		Onsite Discharge	Zero Discharge Alternative Disposal Method	Total Media	
			Onsite Injection	haul/ Onshore Disposal	Pollutant Loadings
Baseline		NA	NA	NA	NA
BAT 1	total	-2,604,704	0	-628,364	-3,233,068
BAT 2	total	-3,123,322	0	-109,746	-3,233,068
BAT 3	total	-9,921,126	879,710	12,721,869	3,680,452

**WORKSHEET CC: NEW AND EXISTING SOURCE DRILLING FLUID DISPOSAL LOADINGS BY REGION, OPTION, FLUID TYPE, AND LOCATION**
**Gulf of Mexico -- Lower WBF Failure Rate**

		Onsite Discharge	Zero Discharge Alternative Disposal Method		Total Media Pollutant Loadings			
			Onsite Injection	haul/ Onshore Disposal		Onsite (marine) Discharges	Onshore Disposal	All Media Totals
Baseline	wbf	2,185,987,899	0	0	2,185,987,899			
	sbf	255,295,955	0	0	255,295,955			
	obf	0	11,862,178	48,705,439	60,567,617			
	total	2,441,283,854	11,862,178	48,705,439	2,501,851,471			
BAT 1	wbf	2,050,964,806	0	0	2,050,964,806			
	sbf	279,869,420	0	0	279,869,420			
	obf	0	7,092,172	28,997,053	36,089,225			
	total	2,330,834,226	7,092,172	28,997,053	2,366,923,451			
BAT 2	wbf	2,050,964,806	0	0	2,050,964,806			
	sbf	271,789,237	0	8,080,183	279,869,420			
	obf	0	7,092,172	28,997,053	36,089,225			
	total	2,322,754,043	7,092,172	37,077,236	2,366,923,451			
BAT 3	wbf	2,244,509,591	0	0	2,244,509,591			
	sbf	0	0	22,618,880	22,618,880			
	obf	0	36,980,946	215,992,842	252,973,788			
	total	2,244,509,591	36,980,946	238,611,723	2,520,102,259			
						-110,449,628	-24,478,392	(134,928,020)
						-118,529,811	-16,398,209	(134,928,020)
						-196,774,263	215,025,051	18,250,789

**California -- Lower WBF Failure Rate**

		Onsite Discharge	Zero Discharge Alternative Disposal Method		Total Media Pollutant Loadings			
			Onsite Injection	haul/ Onshore Disposal		Onsite (marine) Discharges	Onshore Disposal	All Media Totals
Baseline	wbf	9,617,040	0	0	9,617,040			
	sbf	0	0	0	0			
	obf	0	1,945,148	0	1,945,148			
	total	9,617,040	1,945,148	0	11,562,188			
BAT 1	wbf	9,617,040	0	0	9,617,040			
	sbf	0	0	0	0			
	obf	0	1,945,148	0	1,945,148			
	total	9,617,040	1,945,148	0	11,562,188			
BAT 2	wbf	9,617,040	0	0	9,617,040			
	sbf	0	0	0	0			
	obf	0	1,945,148	0	1,945,148			
	total	9,617,040	1,945,148	0	11,562,188			
BAT 3	wbf	9,617,040	0	0	9,617,040			
	sbf	0	0	0	0			
	obf	0	1,945,148	0	1,945,148			
	total	9,617,040	1,945,148	0	11,562,188			
						0	0	-
						0	0	-
						0	0	-

Alaska -- lower WBF Failure Rate

		Onsite Discharge	Zero Discharge Alternative Disposal Method	Total Media	Onsite (marine) Discharges	Onshore Disposal	All Media Totals
			Onsite Injection	haul/ Onshore Disposal			
Baseline				Pollutant Loadings			
	wbf	8,407,772	0	0	8,407,772		
	sbf	0	0	0	0		
	obf	0	1,945,148	0	1,945,148		
	total	8,407,772	1,945,148	0	10,352,920		
BAT 1							
	wbf	8,407,772	0	0	8,407,772		
	sbf	552,796	0	0	552,796		
	obf	0	1,316,784	0	1,316,784		
	total	8,960,568	1,316,784	0	10,277,352	552,796	-628,364
BAT 2							
	wbf	8,407,772	0	0	8,407,772		
	sbf	536,696	16,100	0	552,796		
	obf	0	1,316,784	0	1,316,784		
	total	8,944,468	1,332,884	0	10,277,352	536,696	-612,264
BAT 3							
	wbf	8,407,772	0	0	8,407,772		
	sbf	0	0	0	0		
	obf	0	1,945,148	0	1,945,148		
	total	8,407,772	1,945,148	0	10,352,920	0	0

TOTAL -- Lower Failure Rate

		Onsite Discharge	Zero Discharge Alternative Disposal Method	Total Media	Onsite (marine) Discharges	Onshore Disposal	All Media Totals
			Onsite Injection	haul/ Onshore Disposal			
Baseline				Pollutant Loadings			
	wbf	2,204,012,710	0	0	2,204,012,710		
	sbf	255,295,955	0	0	255,295,955		
	obf	0	15,752,474	48,705,439	64,457,913		
	total	2,459,308,665	15,752,474	48,705,439	2,523,766,578		
BAT 1							
	wbf	2,068,989,617	0	0	2,068,989,617		
	sbf	280,422,216	0	0	280,422,216		
	obf	0	10,354,104	28,997,053	39,351,157		
	total	2,349,411,833	10,354,104	28,997,053	2,388,762,990	-109,896,832	-25,106,756
BAT 2							
	wbf	2,068,989,617	0	0	2,068,989,617		
	sbf	272,325,933	16,100	8,080,183	280,422,216		
	obf	0	10,354,104	28,997,053	39,351,157		
	total	2,341,315,550	10,370,204	37,077,236	2,388,762,990	-117,993,115	-17,010,473
BAT 3							
	wbf	2,262,534,402	0	0	2,262,534,402		
	sbf	0	0	22,618,880	22,618,880		
	obf	0	40,871,242	215,992,842	256,864,084		
	total	2,262,534,402	40,871,242	238,611,723	2,542,017,367	-196,774,263	215,025,051

**INCREMENTAL LOADINGS (REDUCTIONS)**
**ALL SOURCES, Lower WBF Failure Rate**

		Onsite Discharge	Zero Discharge Alternative Disposal Method	Total Media	
			Onsite Injection	Haul/ Onshore Disposal	Pollutant Loadings
Baseline					
	wbf				
	sbf				
	obf				
	total				
BAT 1					
	wbf	-135,023,093	0	0	-135,023,093
	sbf	25,126,261	0	0	25,126,261
	obf	0	-5,398,370	-19,708,386	-25,106,756
	total	-109,896,832	-5,398,370	-19,708,386	-135,003,588
BAT 2					
	wbf	-135,023,093	0	0	-135,023,093
	sbf	17,029,978	16,100	8,080,183	25,126,261
	obf	0	-5,398,370	-19,708,386	-25,106,756
	total	-117,993,115	-5,382,270	-11,628,203	-135,003,588
BAT 3					
	wbf	58,521,692	0	0	58,521,692
	sbf	-255,295,955	0	22,618,880	-232,677,075
	obf	0	25,118,768	167,287,403	192,406,171
	total	-196,774,263	25,118,768	189,906,284	18,250,789

**SUMMARY TOTAL LOADINGS (REDUCTIONS)**
**ALL SOURCES, Lower WBF Failure Rate**

		Onsite Discharge	Zero Discharge Alternative Disposal Method	Total Media	
			Onsite Injection	Haul/ Onshore Disposal	Pollutant Loadings
Baseline	total	2,459,308,665	15,752,474	48,705,439	2,523,766,578
BAT 1	total	2,349,411,833	10,354,104	28,997,053	2,388,762,990
BAT 2	total	2,341,315,550	10,370,204	37,077,236	2,388,762,990
BAT 3	total	2,262,534,402	40,871,242	238,611,723	2,542,017,367

**SUMMARY INCREMENTAL LOADINGS (REDUCTIONS)**
**ALL SOURCES, Lower WBF Failure Rate**

		Onsite Discharge	Zero Discharge Alternative Disposal Method	Total Media	
			Onsite Injection	Haul/ Onshore Disposal	Pollutant Loadings
Baseline		NA	NA	NA	NA
BAT 1	total	-109,896,832	-5,398,370	-19,708,386	-135,003,588
BAT 2	total	-117,993,115	-5,382,270	-11,628,203	-135,003,588
BAT 3	total	-196,774,263	25,118,768	189,906,284	18,250,789

## SBF Drilling Waste Pollutant Concentrations

Pollutant Name	Average Concentration of Pollutants in Drilling Waste		Reference
<b>Conventional Pollutants</b>		<b>lbs/bbl-drilling fluid</b>	
Total Oil as SBF Basefluid		190.491	Derived from SBF formulation and densities (see "Model Well Input Data" worksheet) **
Total Oil as Formation Oil		0.588	
Total Oil (SBF Basefluid + Form. Oil)		191.079	
TSS as barite		133.749	
<b>Priority Pollutant Organics</b>	<b>mg/ml *</b>	<b>lbs/bbl-drilling fluid</b>	
Naphthalene	1.43	0.0010024	Calculated from diesel oil composition in Offshore Dev. Doc., Table VII-9 **
Fluorene	0.78	0.0005468	
Phenanthrene	1.85	0.0012968	
Phenol (ug/g)	6	0.00003528	
<b>Priority Pollutants, Metals</b>	<b>mg/kg-barite</b>	<b>lbs/lb-dry SBF ***</b>	
Cadmium	1.1	0.0000011	Offshore Dev. Doc., Table XI-6
Mercury	0.1	0.0000001	
Antimony	5.7	0.0000057	
Arsenic	7.1	0.0000071	
Beryllium	0.7	0.0000007	
Chromium	240.0	0.0002400	
Copper	18.7	0.0000187	
Lead	35.1	0.0000351	
Nickel	13.5	0.0000135	
Selenium	1.1	0.0000011	
Silver	0.7	0.0000007	
Thallium	1.2	0.0000012	
Zinc	200.5	0.0002005	
<b>Non-Conventional Pollutants</b>	<b>mg/kg-barite</b>	<b>lbs/lb-dry SBF ***</b>	
Aluminum	9,069.9	0.0090699	Offshore Dev. Doc., Table XI-6
Barium ****	588,000	0.5880000	
Iron	15,344.3	0.0153443	
Tin	14.6	0.0000146	
Titanium	87.5	0.0000875	
	<b>mg/ml *</b>	<b>lbs/bbl-drilling fluid</b>	
Alkylated benzenes	8.05	0.0056429	Calculated from diesel oil composition in Offshore Dev. Doc., Table VII-9 **
Alkylated naphthalenes	75.68	0.0530502	
Alkylated fluorenes	9.11	0.0063859	
Alkylated phenanthrenes	11.51	0.0080683	
Alkylated phenols (ug/g)	52.9	0.0000311	
Total biphenyls	14.96	0.0104867	
Total dibenzothiophenes (ug/g)	760	0.0004469	

\* Except where noted

\*\* Includes assumption of 0.2% formation oil contamination

\*\*\* The dry weight (lbs) of the barite component in a SBF is equivalent to the term "lb-dry SBF"

\*\*\*\* Barium is derived from assumptions list on Page XI-8, Offshore Dev. Doc.

[i.e. barite is pure barium sulfate (BaSO<sub>4</sub>) and by molecular weights barium sulfate is 58.8% by weight barium]

**WORKSHEET No. O:**
**Revised Drilling Fluid Well Counts, to include Water-base Fluid wells**

(well counts reflect number of wells &lt; USING &gt; not hauling or discharging the mud types listed)

		Baseline	BAT 1	BAT 2	BAT 3
% OBF > SBF	GOM	0%	40%	40%	0%
	CA	20%	40%	40%	0%
	AK	20%	40%	40%	0%
% WBF > SBF	GOM	0%	6%	6%	0%
	CA	0%	6%	6%	0%
	AK	0%	6%	6%	0%

**BASELINE**
**Existing Sources**

SBF/OBF/WBF	Region	SWD	SWE	DWD	DWE	TOTALS	
WBF	Gulf of Mexico	511	298	12	36	857	
SBF	Gulf of Mexico	86	51	16	48	201	
OBF	Gulf of Mexico	42	25	0	0	67	1,125
WBF	Offshore California	3	2	0	0	5	
SBF	Offshore California	0	0	0	0	-	
OBF	Offshore California	1	1	0	0	2	7
WBF	Cook Inlet, Alaska	3	1	0	0	4	
SBF	Cook Inlet, Alaska	0	0	0	0	-	
OBF	Cook Inlet, Alaska	1	1	0	0	2	6
							1,138

**New Sources**

SBF/OBF/WBF	Region	SWD	SWE	DWD	DWE	TOTALS	
WBF	Gulf of Mexico	27	0	11	0	38	
SBF	Gulf of Mexico	5	0	15	0	20	
OBF	Gulf of Mexico	2	0	0	0	2	60
WBF	Offshore California	0	0	0	0	-	
SBF	Offshore California	0	0	0	0	-	
OBF	Offshore California	0	0	0	0	-	-
WBF	Cook Inlet, Alaska	0	0	0	0	-	
SBF	Cook Inlet, Alaska	0	0	0	0	-	
OBF	Cook Inlet, Alaska	0	0	0	0	-	-

Note: By definition "exploratory" wells are excluded from the "new sources" category

 60  
1,198

**BAT OPT 1**
**Existing Sources**

SBF/OBF/WBF	Region	SWD	SWE	DWD	DWE	TOTALS	
WBF	Gulf of Mexico	479	279	11	34	803	
SBF	Gulf of Mexico	124	74	17	49	264	
OBF	Gulf of Mexico	25	15	0	0	40	1,107
WBF	Offshore California	3	2	0	0	5	
SBF	Offshore California	0	0	0	0	-	
OBF	Offshore California	1	1	0	0	2	7
WBF	Cook Inlet, Alaska	3	1	0	0	4	
SBF	Cook Inlet, Alaska	1	0	0	0	1	
OBF	Cook Inlet, Alaska	0	1	0	0	1	6
							1,120

**New Sources**

SBF/OBF/WBF	Region	SWD	SWE	DWD	DWE	TOTALS	
WBF	Gulf of Mexico	25	0	10	0	35	
SBF	Gulf of Mexico	8	0	16	0	24	
OBF	Gulf of Mexico	1	0	0	0	1	60
WBF	Offshore California	0	0	0	0	-	
SBF	Offshore California	0	0	0	0	-	
OBF	Offshore California	0	0	0	0	-	-
WBF	Cook Inlet, Alaska	0	0	0	0	-	
SBF	Cook Inlet, Alaska	0	0	0	0	-	
OBF	Cook Inlet, Alaska	0	0	0	0	-	-

Note: By definition "exploratory" wells are excluded from the "new sources" category

 60  
1,180

**BAT OPT 2**
**Existing Sources**

SBF/OBF/WBF	Region	SWD	SWE	DWD	DWE	TOTALS	
WBF	Gulf of Mexico	479	279	11	34	803	
SBF	Gulf of Mexico	124	74	17	49	264	
OBF	Gulf of Mexico	25	15	0	0	40	1,107
WBF	Offshore California	3	2	0	0	5	
SBF	Offshore California	0	0	0	0	-	
OBF	Offshore California	1	1	0	0	2	7
WBF	Cook Inlet, Alaska	3	1	0	0	4	
SBF	Cook Inlet, Alaska	1	0	0	0	1	
OBF	Cook Inlet, Alaska	0	1	0	0	1	6
							1,120

**New Sources**

SBF/OBF/WBF	Region	SWD	SWE	DWD	DWE	TOTALS	
WBF	Gulf of Mexico	25	0	10	0	35	
SBF	Gulf of Mexico	8	0	16	0	24	
OBF	Gulf of Mexico	1	0	0	0	1	60
WBF	Offshore California	0	0	0	0	-	
SBF	Offshore California	0	0	0	0	-	
OBF	Offshore California	0	0	0	0	-	-
WBF	Cook Inlet, Alaska	0	0	0	0	-	
SBF	Cook Inlet, Alaska	0	0	0	0	-	
OBF	Cook Inlet, Alaska	0	0	0	0	-	-

Note: By definition "exploratory" wells are excluded from the "new sources" category

60  
1,180

**BAT OPT 3**
**Existing Sources**

SBF/OBF/WBF	Region	SWD	SWE	DWD	DWE	TOTALS	
WBF	Gulf of Mexico	511	298	17	51	877	
SBF	Gulf of Mexico	0	0	3	8	11	
OBF	Gulf of Mexico	128	76	8	25	237	1,125
WBF	Offshore California	3	2	0	0	5	
SBF	Offshore California	0	0	0	0	-	
OBF	Offshore California	1	1	0	0	2	7
WBF	Cook Inlet, Alaska	3	1	0	0	4	
SBF	Cook Inlet, Alaska	0	0	0	0	-	
OBF	Cook Inlet, Alaska	1	1	0	0	2	6
							1,138

**New Sources**

SBF/OBF/WBF	Region	SWD	SWE	DWD	DWE	TOTALS	
WBF	Gulf of Mexico	27	0	15	0	42	
SBF	Gulf of Mexico	0	0	3	0	3	
OBF	Gulf of Mexico	7	0	8	0	15	60
WBF	Offshore California	0	0	0	0	-	
SBF	Offshore California	0	0	0	0	-	
OBF	Offshore California	0	0	0	0	-	-
WBF	Cook Inlet, Alaska	0	0	0	0	-	
SBF	Cook Inlet, Alaska	0	0	0	0	-	
OBF	Cook Inlet, Alaska	0	0	0	0	-	-

Note: By definition "exploratory" wells are excluded from the "new sources" category

60  
1,198



**WORKSHEET No. P:**  
**Drilling Fluid Well Counts, including Water-base Fluids Wells**

GULF OF MEXICO OPERATIONS									
	% Total Wells by DF-type	Wells	% DW Wells by DF-type	DWD	DWE	No. SW Wells Rem'g	SWD	SWE	
<b>Total Annual</b>		1,127		48	76	1,003	645	358	
<b>% of SW wells</b>				38.7%	61.3%		64.3%	35.7%	
<b>DF-type</b>									
WBF	80%	902	25%	12	19	871	560	311	
SBF	10%	113	75%	36	57	20	13	7	
OBF	10%	112	0%	0	0	112	72	40	

Background indicates well counts from EPA NODA; EPA counts are ignored. but %Dev & %Expl applied to industry data, which given only at shallow+deep level.

  

<b>% Total Wells:</b>									
<b>Existing Sources:</b>				50%	100%		95%	100%	
<b>New Sources:</b>				50%	0%		5%	0%	

  

(new+existing sources)									
<b>GM - Deep</b>	<b>GM - Shal</b>	<b>Existing Sources: BASELINE DISCHARGES</b>							
59	836	WBF		12	36		511	298	
		WBF>SBF(a)		0	0		0	0	857
79	142	SBF		16	48		86	51	201
		OBF>SBF(a)		0	0		0	0	0
-	69	OBF(a)		0	0		42	25	67
138	1,047	WBF+OBF>SBF(a)		0	0		0	0	1,125
<b>GM</b>		<b>New Sources: BASELINE DISCHARGES</b>							
59	836	WBF		11	0		27	0	38
		WBF>SBF(a)		0	0		0	0	0
79	142	SBF		15	0		5	0	20
		OBF>SBF(a)		0	0		0	0	0
0	69	OBF(a)		0	0		2	0	2
138	1,047	WBF+OBF>SBF(a)		0	0		0	0	60
(a) Estimate represents OBF wells = 0% assumed to convert to SBF under the baseline scenario, plus an assumed 0% conversion of WBF wells to SBF.									

  

Adj't for well red'n, enhanced directional drilling, WBF>SBF:									
<b>GM</b>		<b>Existing Sources: BAT OPT 1 DISCHARGES</b>							
		WBF		11	34		479	279	803
		WBF>SBF(b)		1	2		32	19	54
		SBF(b)		16	47		75	45	183
		OBF>SBF(b)		0	0		17	10	27
		OBF(b)		0	0		25	15	40
		WBF+OBF>SBF(b)		1	2		49	29	1,107
<b>GM</b>		<b>New Sources: BAT OPT 1 DISCHARGES</b>							
		WBF		10	0		25	0	35
		WBF>SBF(b)		1	0		2	0	3
		SBF(b)		15	0		5	0	20
		OBF>SBF(b)		0	0		1	0	1
		OBF(b)		0	0		1	0	1
		WBF+OBF>SBF(b)		1	0		3	0	60
(b) Estimate represents OBF wells = 40% assumed to convert to SBF under any discharge options, plus an assumed 6% conversion of WBF wells to SBF.									

  

				28	84		639	374	
				28	84		639	374	
<b>GM</b>		<b>Existing Sources: BAT OPT 2 DISCHARGES</b>							
		WBF		11	34		479	279	803
		WBF>SBF(b)		1	2		32	19	54
		SBF(b)		16	47		75	45	183
		OBF>SBF(b)		0	0		17	10	27
		OBF(b)		0	0		25	15	40
		WBF+OBF>SBF(b)		1	2		49	29	1,107
<b>GM</b>		<b>New Sources: BAT OPT 2 DISCHARGES</b>							
		WBF		10	0		25	0	35
		WBF>SBF(b)		1	0		2	0	3
		SBF(b)		15	0		5	0	20
		OBF>SBF(b)		0	0		1	0	1
		OBF(b)		0	0		1	0	1
		WBF+OBF>SBF(b)		1	0		3	0	60
(b) Estimate represents OBF wells = 40% assumed to convert to SBF under any discharge options, plus an assumed 6% conversion of WBF wells to SBF.									

  

				28	84		639	374	
				28	84		639	374	
<b>GM</b>		<b>Existing Sources: BAT OPT 3 (ZERO DISCHARGE)</b>							
0.6		WBF		17	51		511	298	877
		WBF>SBF(c)		0	0		0	0	0
0.1		SBF(c)		3	8		0	0	11
		OBF>SBF(c)		0	0		0	0	0
0.3		OBF(c)		8	25		128	76	237
		WBF+OBF>SBF(c)		0	0		0	0	1,125
<b>GM</b>		<b>New Sources: BAT OPT 3 (ZERO DISCHARGE)</b>							
0.6		WBF		15	0		27	0	42
		WBF>SBF(c)		0	0		0	0	0
0.1		SBF(c)		3	0		0	0	3
		OBF>SBF(c)		0	0		0	0	0
0.3		OBF(c)		8	0		7	0	15
		WBF+OBF>SBF(c)		0	0		0	0	60
(c) Estimate represents OBF wells = 0% assumed to convert to SBF under zero discharge option, plus an assumed 0% 0%									

Background indicates data from L Henry response to CAJ questions	CALIFORNIA OPERATIONS									Background indicates well counts from EPA NODA; counts ignored but %s D & E applied to industry data given only at shallow+deep level.
		% Total Wells by DF-type	Wells	% DW Wells by DF-type	DWD	DWE	No. SW Wells Rem'g	SWD	SWE	
	Total Annual		26		15	0	11		0	
	WBF (d)				25.0%	25.0%		86.8%	86.8%	
	SBF (d)				0%	0%		0%	0%	
	OBF (d)				75.0%	75.0%		13.2%	13.2%	

CA - Deep	CA - Shal	<b>Existing Sources: BASELINE DISCHARGES</b>									
0	5	WBF		0	0		3	2		5	5
		WBF>SBF(a)		0	0		0	0		0	
0	0	SBF		0	0		0	0		0	0
		OBF>SBF(a)		0	0		0	0		0	
0	2	OBF		0	0		1	1		2	2
0	7	WBF+OBF>SBF(a)		0	0		0	0		7	
CA		<b>New Sources: BASELINE DISCHARGES (e)</b>									
		WBF		0	0		0	0		0	0
		WBF>SBF(a)		0	0		0	0		0	
		SBF		0	0		0	0		0	0
		OBF>SBF(a)		0	0		0	0		0	
		OBF		0	0		0	0		0	0
		WBF+OBF>SBF(a)		0	0		0	0		0	7
(a) Estimate represents OBF wells = 20% assumed to convert to SBF under the baseline scenario, plus an assumed 0% conversion of WBF wells to SBF. (d) Currently, no SBF is used in California operations; estimated percentage of OBF+SBF usage for deep- and shallow-water wells are based on available Gulf of Mexico usage data. (e) There are no new sources projected for California operations.											

CA		<b>Existing Sources: BAT OPT 1 DISCHARGES</b>									
		WBF		0	0		3	2		5	5
		WBF>SBF(b)		0	0		0	0		0	
		SBF(b)		0	0		0	0		0	0
		OBF>SBF(b)		0	0		0	0		0	
		OBF(b)		0	0		1	1		2	2
		WBF+OBF>SBF(b)		0	0		0	0		7	
CA		<b>New Sources: BAT OPT 1 DISCHARGES</b>									
		WBF		0	0		0	0		0	0
		WBF>SBF(b)		0	0		0	0		0	
		SBF(b)		0	0		0	0		0	0
		OBF>SBF(b)		0	0		0	0		0	
		OBF(b)		0	0		0	0		0	0
		WBF+OBF>SBF(b)		0	0		0	0		0	7
(b) Estimate represents OBF wells = 40% assumed to convert to SBF under any discharge options, plus an assumed 6% conversion of WBF wells to SBF.											

CA		<b>Existing Sources: BAT OPT 2 DISCHARGES</b>									
		WBF		0	0		3	2		5	5
		WBF>SBF(b)		0	0		0	0		0	
		SBF(b)		0	0		0	0		0	0
		OBF>SBF(b)		0	0		0	0		0	
		OBF(b)		0	0		1	1		2	2
		WBF+OBF>SBF(b)		0	0		0	0		7	
CA		<b>New Sources: BAT OPT 2 DISCHARGES</b>									
		WBF		0	0		0	0		0	0
		WBF>SBF(b)		0	0		0	0		0	
		SBF(b)		0	0		0	0		0	0
		OBF>SBF(b)		0	0		0	0		0	
		OBF(b)		0	0		0	0		0	0
		WBF+OBF>SBF(b)		0	0		0	0		0	7
(b) Estimate represents OBF wells = 40% assumed to convert to SBF under any discharge options, plus an assumed 6% conversion of WBF wells to SBF.											

CA		<b>Existing Sources: BAT OPT 3 (ZERO DISCHARGE)</b>									
		WBF		0	0		3	2		5	5
		WBF>SBF(c)		0	0		0	0		0	
		SBF(c)		0	0		0	0		0	0
		OBF>SBF(c)		0	0		0	0		0	
		OBF(c)		0	0		1	1		2	2
		WBF+OBF>SBF(c)		0	0		0	0		7	
CA		<b>New Sources: BAT OPT 3 (ZERO DISCHARGE)</b>									
		WBF		0	0		0	0		0	0
		WBF>SBF(c)		0	0		0	0		0	
		SBF(c)		0	0		0	0		0	0
		OBF>SBF(c)		0	0		0	0		0	
		OBF(c)		0	0		0	0		0	0
		WBF+OBF>SBF(c)		0	0		0	0		0	7
(c) Estimate represents OBF wells = 0% assumed to convert to SBF under zero discharge option, plus an assumed 0% conversion of WBF wells to SBF.											

ALASKA (COOK INLET) OPERATIONS								
	% Total Wells by DF-type	Wells	% DW Wells by DF-type	DWD	DWE	No. SW Wells Rem'g	SWD	SWE
Total Annual		8		1	0	7	7	0
WBF (d)				25.0%	25.0%		86.8%	86.8%
SBF (d)				0%	0%		0%	0%
OBF (d)				75.0%	75.0%		13.2%	13.2%

Background indicates data from L. Henry response to CAJ questions

Background indicates well counts from EPA NODA; counts ignored but %s D & E applied to industry data given only at shallow+deep level.

AK - Deep	AK - Shal	Existing Sources:	BASELINE DISCHARGES						
0	4	WBF		0	0	3	1	4	4
		WBF>SBF(a)		0	0	0	0	0	
0	0	SBF		0	0	0	0	0	0
		OBF>SBF(a)		0	0	0	0	0	
0	2	OBF		0	0	1	1	2	2
0	6	WBF+OBF>SBF(a)		0	0	0	0	6	
AK		New Sources:	BASELINE DISCHARGES (e)						
		WBF		0	0	0	0	0	0
		WBF>SBF(a)		0	0	0	0	0	
		SBF		0	0	0	0	0	0
		OBF>SBF(a)		0	0	0	0	0	
		OBF		0	0	0	0	0	0
		WBF+OBF>SBF(a)		0	0	0	0	0	6
(a) Estimate represents OBF wells = 20% assumed to convert to SBF under the baseline scenario, plus an assumed 0% conversion of WBF wells to SBF. (d) Currently, no SBF is used in Cook Inlet operations; estimated percentage of OBF+SBF usage for deep- and shallow-water wells are based on available Gulf of Mexico usage data. (e) There are no new sources projected for Cook Inlet operations.									
AK		Existing Sources:	BAT OPT 1 DISCHARGES						
		WBF		0	0	3	1	4	4
		WBF>SBF(b)		0	0	0	0	0	
		SBF(b)		0	0	0	0	0	1
		OBF>SBF(b)		0	0	1	0	1	
		OBF(b)		0	0	0	1	1	1
		WBF+OBF>SBF(b)		0	0	1	0	6	
AK		New Sources:	BAT OPT 1 DISCHARGES						
		WBF		0	0	0	0	0	0
		WBF>SBF(b)		0	0	0	0	0	
		SBF(b)		0	0	0	0	0	0
		OBF>SBF(b)		0	0	0	0	0	
		OBF(b)		0	0	0	0	0	0
		WBF+OBF>SBF(b)		0	0	0	0	0	6
(b) Estimate represents OBF wells = 40% assumed to convert to SBF under any discharge options, plus an assumed 6% conversion of WBF wells to SBF.									
AK		Existing Sources:	BAT OPT 2 DISCHARGES						
		WBF		0	0	3	1	4	4
		WBF>SBF(b)		0	0	0	0	0	
		SBF(b)		0	0	0	0	0	1
		OBF>SBF(b)		0	0	1	0	1	
		OBF(b)		0	0	0	1	1	1
		WBF+OBF>SBF(b)		0	0	1	0	6	
AK		New Sources:	BAT OPT 2 DISCHARGES						
		WBF		0	0	0	0	0	0
		WBF>SBF(b)		0	0	0	0	0	
		SBF(b)		0	0	0	0	0	0
		OBF>SBF(b)		0	0	0	0	0	
		OBF(b)		0	0	0	0	0	0
		WBF+OBF>SBF(b)		0	0	0	0	0	6
(b) Estimate represents OBF wells = 40% assumed to convert to SBF under any discharge options, plus an assumed 6% conversion of WBF wells to SBF.									
AK		Existing Sources:	BAT OPT 3 (ZERO DISCHARGE)						
		WBF		0	0	3	1	4	4
		WBF>SBF(c)		0	0	0	0	0	
		SBF(c)		0	0	0	0	0	0
		OBF>SBF(c)		0	0	0	0	0	
		OBF(c)		0	0	1	1	2	2
		WBF+OBF>SBF(c)		0	0	0	0	6	
AK		New Sources:	BAT OPT 3 (ZERO DISCHARGE)						
		WBF		0	0	0	0	0	0
		WBF>SBF(c)		0	0	0	0	0	
		SBF(c)		0	0	0	0	0	0
		OBF>SBF(c)		0	0	0	0	0	
		OBF(c)		0	0	0	0	0	0
		WBF+OBF>SBF(c)		0	0	0	0	0	6
(c) Estimate represents OBF wells = 0% assumed to convert to SBF under zero discharge option, plus an assumed 0% conversion of WBF wells to SBF.									

**WORKSHEET Q:**  
**Gulf of Mexico Regional Annual Total SBF Pollutant Loadings (lbs)**  
**Existing Sources**

**Baseline Annual Total Pollutant Loadings Summary**

Baseline Technology	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total	Notes
	Development	Exploratory	Development	Exploratory		
Discharge w/10.2% retention	54,039,305	67,155,986	15,214,194	101,481,343	237,890,828	Total Wells = 201 SBF wells (from worksheet Well Count Input Data)
Zero Discharge of OBF-wastes	0	0	0	0	0	Total Wells = 67 OBF wells (from worksheet Well Count Input Data)

**BAT Annual Total Pollutant Loadings Summary**

BAT/NSPS Technology Option *	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total	Notes
	Development	Exploratory	Development	Exploratory		
BAT/NSPS Option 1 (Discharge w/4.03% retention)	68,546,728	85,723,524	14,221,049	91,137,013	259,628,314	Total Wells = 201 SBF wells + 67 OBF wells (from worksheet Well Count Input Data)
BAT/NSPS Option 2 (Discharge w/3.82% retention)	66,550,333	83,226,863	13,806,867	88,482,686	252,066,749	Total Wells = 201 SBF wells + 67 OBF wells (from worksheet Well Count Input Data)
Zero Discharge of SBF-wastes	0	0	0	0	0	Total Wells = 201 SBF wells (from worksheet Well Count Input Data)

\* EPA assumes that operators will switch from OBF to SBF under both BAT/NSPS discharge options

**Incremental Annual Total Pollutant Loadings (Reductions) Summary \*\***

Technology Option	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total	Notes
	Development	Exploratory	Development	Exploratory		
Discharge w/10.2% retention	0	0	0	0	0	No reduction between baseline and current practice
BAT/NSPS Option 1 (Discharge w/4.03% retention)	14,507,423	18,567,538	(993,145)	(10,344,330)	21,737,486	Difference between BAT Option 1 loadings and baseline loadings (negative incremental loadings indicate reductions)
BAT/NSPS Option 2 (Discharge w/3.82% retention)	12,511,029	16,070,877	(1,407,327)	(12,998,657)	14,175,921	Difference between BAT Option 2 loadings and baseline loadings (negative incremental loadings indicate reductions)
Zero Discharge of SBF-wastes	(54,039,305)	(67,155,986)	(15,214,194)	(101,481,343)	(237,890,828)	Difference between zero discharge BAT loadings and baseline 10.20% discharge loadings from the 201 wells currently using SBF (negative incremental loadings indicate reductions)

\*\* Incremental Loadings (Reductions) = Technology Option Loadings - Baseline Loadings.

## California Offshore Regional Annual Total SBF Pollutant Loadings Summary (lbs)

### Existing Sources

#### Baseline Annual Total Pollutant Loadings Summary

Baseline Technology	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total	Notes
	Development	Exploratory	Development	Exploratory		
Zero Discharge of SBF & OBF-wastes (Current Practice)	0	0	0	0	0	Total Wells = 0 SBF wells (from worksheet Well Count Input Data)

#### BAT Annual Total Pollutant Loadings Summary

BAT/NSPS Technology Option *	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total	Notes
	Development	Exploratory	Development	Exploratory		
BAT/NSPS Option 1 (Discharge w/4.03% retention)	0	0	0	0	0	Total Wells = 0 SBF wells + 2 OBF wells (from worksheet Well Count Input Data)
BAT/NSPS Option 2 (Discharge w/3.82% retention)	0	0	0	0	0	Total Wells = 0 SBF wells + 2 OBF wells (from worksheet Well Count Input Data)
Zero Discharge of SBF-wastes	0	0	0	0	0	Total Wells = 0 SBF wells (from worksheet Well Count Input Data)

\* EPA assumes that operators will switch from OBF to SBF under both BAT/NSPS discharge options

#### Incremental Annual Total Pollutant Loadings (Reductions) Summary \*\*

Technology Option	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total	Notes
	Development	Exploratory	Development	Exploratory		
Zero Discharge of SBF & OBF-wastes (Current Practice)	0	0	0	0	0	No reduction between baseline and current practice
BAT/NSPS Option 1 (Discharge w/4.03% retention)	0	0	0	0	0	Difference between BAT Option 1 loadings and baseline loadings (negative incremental loadings indicate reductions)
BAT/NSPS Option 2 (Discharge w/3.82% retention)	0	0	0	0	0	Difference between BAT Option 2 loadings and baseline loadings (negative incremental loadings indicate reductions)
Zero Discharge of SBF-wastes	0	0	0	0	0	Difference between zero discharge BAT loadings and baseline zero discharge loadings from the 0 wells currently using SBF (negative incremental loadings indicate reductions)

\*\* Incremental Loadings (Reductions) = Technology Option Loadings - Baseline Loadings.

## Cook Inlet, Alaska, Regional Annual Total SBF Pollutant Loadings Summary (lbs)

### Existing Sources

#### Baseline Annual Total Pollutant Loadings Summary

Baseline Technology	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total	Notes
	Development	Exploratory	Development	Exploratory		
Zero Discharge of SBF & OBF-wastes (Current Practice)	0	0	0	0	0	Total Well(s) = 4 SBF well(s) (from worksheet Well Count Input Data)

#### BAT Annual Total Pollutant Loadings Summary

BAT/NSPS Technology Option *	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total	Notes
	Development	Exploratory	Development	Exploratory		
BAT/NSPS Option 1 (Discharge w/4.03% retention)	552,796	0	0	0	552,796	Total Well(s) = 4 SBF well(s) + 2 OBF well(s) (from worksheet Well Count Input Data)
BAT/NSPS Option 2 (Discharge w/3.82% retention)	536,696	0	0	0	536,696	Total Well(s) = 4 SBF well(s) + 2 OBF well(s) (from worksheet Well Count Input Data)
Zero Discharge of SBF-wastes	0	0	0	0	0	Total Well(s) = 4 SBF well(s) (from worksheet Well Count Input Data)

\* EPA assumes that operators will switch from OBF to SBF under both BAT/NSPS discharge options

#### Incremental Annual Total Pollutant Loadings (Reductions) Summary \*\*

Technology Option	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total	Notes
	Development	Exploratory	Development	Exploratory		
Zero Discharge of SBF & OBF-wastes (Current Practice)	0	0	0	0	0	No reduction between baseline and current practice
BAT/NSPS Option 1 (Discharge w/4.03% retention)	552,796	0	0	0	552,796	Difference between BAT Option 1 loadings and baseline loadings (negative incremental loadings indicate reductions)
BAT/NSPS Option 2 (Discharge w/3.82% retention)	536,696	0	0	0	536,696	Difference between BAT Option 2 loadings and baseline loadings (negative incremental loadings indicate reductions)
Zero Discharge of SBF-wastes	0	0	0	0	0	Difference between zero discharge BAT loadings and baseline zero discharge loadings from the 4 well(s) currently using SBF (negative incremental loadings indicate reductions)

\*\* Incremental Loadings (Reductions) = Technology Option Loadings - Baseline Loadings.

## Summary Pollutant Loadings (Reductions) for Management of SBF Cuttings, Existing Sources (lbs)

### Total Annual Baseline Pollutant Loadings

Baseline Technology	Gulf of Mexico	Offshore California	Cook Inlet, Alaska		Total	Notes
Discharge w/10.2% retention	237,890,828	N/A	N/A		237,890,828	Total Wells = 201 GOM SBF wells
Zero Discharge of OBF-wastes	0	0	0		0	Total Wells = 67 GOM OBF wells + 0 CA SBF wells + 2 CA OBF wells + 4 AK SBF well(s) + 2 AK OBF wells
Total	237,890,828	0	0		237,890,828	Total Wells = 201 GOM SBF wells + 67 GOM OBF wells + 0 CA SBF wells + 2 CA OBF wells + 4 AK SBF well(s) + 2 AK OBF wells

N/A - Not Applicable (as these regions currently do not allow SBF discharges)

### Total Annual Compliance Pollutant Loadings

Technology Option	Gulf of Mexico	Offshore California	Cook Inlet, Alaska		Total	Notes *
Current Practice	237,890,828	0	0		237,890,828	Total Wells = 201 GOM SBF wells + 67 GOM OBF wells + 0 CA SBF wells + 2 CA OBF wells + 4 AK SBF well(s) + 2 AK OBF wells
BAT/NSPS Option 1 (Discharge w/4.03% retention)	259,628,314	0	552,796		260,181,110	Total Wells = 201 GOM SBF wells + 67 GOM OBF wells + 0 CA SBF wells + 2 CA OBF wells + 4 AK SBF well(s) + 2 AK OBF wells
BAT/NSPS Option 2 (Discharge w/3.82% retention)	252,066,749	0	536,696		252,603,445	Total Wells = 201 GOM SBF wells + 67 GOM OBF wells + 0 CA SBF wells + 2 CA OBF wells + 4 AK SBF well(s) + 2 AK OBF wells
Zero Discharge of SBF-wastes	0	0	0		0	Total Wells = 201 GOM SBF wells

\* EPA assumes that operators will switch from OBF to SBF under both BAT/NSPS discharge options

N/A - Not Applicable (as these regions currently do not allow SBF discharges)

### Total Annual Incremental Pollutant Loadings (Reductions)

Technology Option	Gulf of Mexico	Offshore California	Cook Inlet, Alaska		Total	Notes
Current Practice	0	0	0		0	Total Wells = 201 GOM SBF wells + 67 GOM OBF wells + 0 CA SBF wells + 2 CA OBF wells + 4 AK SBF well(s) + 2 AK OBF wells
BAT/NSPS Option 1 (Discharge w/4.03% retention)	21,737,486	0	552,796		22,290,282	Total Wells = 201 GOM SBF wells + 67 GOM OBF wells + 0 CA SBF wells + 2 CA OBF wells + 4 AK SBF well(s) + 2 AK OBF wells
BAT/NSPS Option 2 (Discharge w/3.82% retention)	14,175,921	0	536,696		14,712,617	Total Wells = 201 GOM SBF wells + 67 GOM OBF wells + 0 CA SBF wells + 2 CA OBF wells + 4 AK SBF well(s) + 2 AK OBF wells
Zero Discharge of SBF-wastes	(237,890,828)	N/A	N/A		(237,890,828)	Total Wells = 201 GOM SBF wells

N/A - Not Applicable (as these regions currently do not allow SBF discharges)

**WORKSHEET R:****Summary Dry Drill Cuttings and SBF Pollutant Loadings (Reductions) for Management of SBF Cuttings, Existing Sources (lbs)****Total Annual Dry Drill Cuttings and SBF Baseline Pollutant Loadings**

Baseline Technology	Gulf of Mexico		Offshore California		Cook Inlet, Alaska		Total	
	Dry Drill Cuttings	SBF	Dry Drill Cuttings	SBF	Dry Drill Cuttings	SBF	Dry Drill Cuttings	SBF
Discharge w/10.2% retention	194,650,820	43,240,008	N/A	N/A	N/A	N/A	194,650,820	43,240,008
Zero Discharge of OBF-wastes	0	0	0	0	0	0	0	0
Total	194,650,820	43,240,008	0	0	0	0	194,650,820	43,240,008

N/A - Not Applicable (as these regions currently do not allow SBF discharges)

**Total Annual Dry Drill Cuttings and SBF Compliance Pollutant Loadings**

Technology Option	Gulf of Mexico		Offshore California		Cook Inlet, Alaska		Total	
	Dry Drill Cuttings	SBF	Dry Drill Cuttings	SBF	Dry Drill Cuttings	SBF	Dry Drill Cuttings	SBF
Current Practice	194,650,820	43,240,008	0	0	0	0	194,650,820	43,240,008
BAT/NSPS Option 1 (Discharge w/4.03% retention)	243,181,120	16,447,194	1,591,590	(1,591,590)	4,211,480	(3,658,684)	248,984,190	11,196,920
BAT/NSPS Option 2 (Discharge w/3.82% retention)	237,038,491	15,028,258	1,551,387	(1,551,387)	4,105,100	(3,568,404)	242,694,978	9,908,467
Zero Discharge of SBF-wastes	0	0	N/A	N/A	N/A	N/A	0	0

\* EPA assumes that operators will switch from OBF to SBF under both BAT/NSPS discharge options

N/A - Not Applicable (as these regions currently do not allow SBF discharges)

**Total Annual Dry Drill Cuttings and SBF Incremental Pollutant Loadings (Reductions)**

Current Practice	Gulf of Mexico		Offshore California		Cook Inlet, Alaska		Total	
	Dry Drill Cuttings	SBF	Dry Drill Cuttings	SBF	Dry Drill Cuttings	SBF	Dry Drill Cuttings	SBF
Current Practice	0	0	0	0	0	0	0	0
BAT/NSPS Option 1 (Discharge w/4.03% retention)	48,530,300	(26,792,814)	1,591,590	(1,591,590)	4,211,480	(3,658,684)	54,333,370	(32,043,088)
BAT/NSPS Option 2 (Discharge w/3.82% retention)	42,387,671	(28,211,749)	1,551,387	(1,551,387)	4,105,100	(3,568,404)	48,044,158	(33,331,541)
Zero Discharge of SBF-wastes	(194,650,820)	(43,240,008)	N/A	N/A	N/A	N/A	(194,650,820)	(43,240,008)

N/A - Not Applicable (as these regions currently do not allow SBF discharges)



**WORKSHEET S:**
**Gulf of Mexico Regional Annual Total Pollutant Loadings Summary (lbs) from New Sources**
**Baseline Annual Total Pollutant Loadings Summary: SBF, New Source Onsite Discharges**

\ Technology	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total	Notes
	Development	Exploratory	Development	Exploratory		
Discharge w/10.2% retention	3,141,820	0	14,263,307	0	17,405,127	Total Wells = 20 SBF wells (from worksheet Well Count Input Data)

**BAT Annual Total Pollutant Loadings Summary: SBF, New Source Onsite Discharges**

BAT/NSPS Technology Option *	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total	Notes
	Development	Exploratory	Development	Exploratory		
BAT/NSPS Option 1 (Discharge w/4.03% retention)	5,026,912	0	15,214,194	0	20,241,106	Total Wells = 20 SBF wells (from worksheet Well Count Input Data)
BAT/NSPS Option 2 (Discharge w/3.82% retention)	4,898,112	0	14,824,376	0	19,722,488	Total Wells = 20 SBF wells (from worksheet Well Count Input Data)
Zero Discharge of SBF-wastes	0	0	0	0	0	Total Wells = 20 SBF wells (from worksheet Well Count Input Data)

**Incremental Annual Total Pollutant Loadings (Reductions) Summary : SBF, New Sources\* Onsite Discharges**

Technology Option	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total	Notes
	Development	Exploratory	Development	Exploratory		
Discharge w/10.2% retention	0	0	0	0	0	No reduction between baseline and current practice
BAT/NSPS Option 1 (Discharge w/4.03% retention)	1,885,092	0	950,887	0	2,835,979	Difference between NSPS Option 1 loadings and baseline loadings (negative incremental loadings indicate reductions)
BAT/NSPS Option 2 (Discharge w/3.82% retention)	1,756,292	0	561,069	0	2,317,361	Difference between NSPS Option 2 loadings and baseline loadings (negative incremental loadings indicate reductions)
Zero Discharge of SBF-wastes	(3,141,820)	0	(14,263,307)	0	(17,405,127)	Difference between zero discharge NSPS loadings and baseline 10.20% discharge loadings from the 20 wells expected to use SBF (negative incremental loadings indicate reductions)

\*\* Incremental Loadings (Reductions) = Technology Option Loadings - Baseline Loadings.

**WORKSHEET T:**
**Summary: New Sources**
**Baseline**

	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total
	Development	Exploratory	Development	Exploratory	
No. wells, SBF	5	0	15	0	20
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Discharge	3,141,820	0	14,263,307	0	17,405,127
Total Wells, Zero Discharge	0	0	0	0	0
Onsite Injection (20%S: 0%D)	0	0	0	0	0
Onshore Disposal (80%S:100%D)	0	0	0	0	0
No. wells, OBF	2	0	0	0	2
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Zero Discharge	1,256,728	0	0	0	1,256,728
Onsite Injection (20%S: 0%D)	0	0	0	0	0
Onshore Disposal (80%S:100%D)	1,256,728	0	0	0	1,256,728

**Summary: New Sources**
**BAT 1**

	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total
	Development	Exploratory	Development	Exploratory	
No. wells, SBF	8	0	16	0	24
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Discharge	5,026,912	0	15,214,194	0	20,241,106
Total Wells, Zero Discharge	0	0	0	0	0
Onsite Injection (20%S: 0%D)	0	0	0	0	0
Onshore Disposal (80%S:100%D)	0	0	0	0	0
No. wells, OBF	1	0	0	0	1
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Zero Discharge	628,364	0	0	0	628,364
Onsite Injection (20%S: 0%D)	0	0	0	0	0
Onshore Disposal (80%S:100%D)	628,364	0	0	0	628,364

**Summary: New Sources**
**BAT 2**

	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total
	Development	Exploratory	Development	Exploratory	
No. wells, SBF	8	0	16	0	24
Loadings/well (lbs)	16,100	33,739	24,364	54,170	
Total Wells, Zero Discharge	8	0	16	0	24
Onsite Injection (0%S: 0%D)	0	0	0	0	0
Onshore Disposal (100%S:100%D)	128,800	0	389,818	0	518,618
No. wells, OBF	1	0	0	0	1
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Zero Discharge	628,364	0	0	0	628,364
Onsite Injection (20%S: 0%D)	0	0	0	0	0
Onshore Disposal (80%S:100%D)	628,364	0	0	0	628,364

	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total
	Development	Exploratory	Development	Exploratory	
No. wells, SBF	8	0	16	0	24
Loadings/well (lbs)	612,264	1,283,045	926,523	2,060,025	
Total Loadings, Discharge	4,898,112	0	14,824,376	0	19,722,488

**Summary: New Sources**
**BAT 3**

	Shallow Water (<1,000 ft)		Deep Water (>1,000 ft)		Total
	Development	Exploratory	Development	Exploratory	
No. wells, SBF	0	0	3	0	3
Loadings/well (lbs)	628,364	1,316,784	950,887	2,114,195	
Total Loadings, Zero Discharge	0	0	2,852,661	0	2,852,661
Onsite Injection (20%S: 0%D)	0	0	0	0	0
Onshore Disposal (80%S:100%D)	0	0	2,852,661	0	2,852,661
No. wells, OBF	7	0	8	0	15
Loadings/well (lbs)	1,885,092	3,950,352	2,852,661	6,342,584	
Total Loadings, Zero Discharge	4,398,548	0	7,607,097	0	12,005,645
Onsite Injection (20%S: 0%D)	879,710	0	0	0	879,710
Onshore Disposal (80%S:100%D)	3,518,838	0	7,607,097	0	11,125,935

**WORKSHEET No. W:**  
**Summary Dry Drill Cuttings and SBF Pollutant Loadings (Reductions)**  
**for Management of SBF Cuttings, New Sources (lbs)**

**Total Annual Dry Drill Cuttings and SBF Baseline Pollutant Loadings**

Baseline Technology	Gulf of Mexico	
	Dry Drill Cuttings	SBF
Discharge w/10.2% retention	14,241,500	3,163,627

N/A - Not Applicable (as these regions currently do not allow SBF discharges)

**Total Annual Dry Drill Cuttings and SBF Compliance Pollutant Loadings**

Technology Option	Gulf of Mexico	
	Dry Drill Cuttings	SBF
Current Practice	14,241,500	3,163,627
BAT/NSPS Option 1 (Discharge w/4.03% retention)	14,241,500	5,999,606
BAT/NSPS Option 2 (Discharge w/3.82% retention)	13,881,767	5,840,721
Zero Discharge of SBF-wastes	0	0

\* EPA assumes that operators will switch from OBF to SBF under both BAT/NSPS discharge options

N/A - Not Applicable (as these regions currently do not allow SBF discharges)

**Total Annual Dry Drill Cuttings and SBF Incremental Pollutant Loadings (Reductions)**

Current Practice	Gulf of Mexico	
	Dry Drill Cuttings	SBF
Current Practice	0	0
BAT/NSPS Option 1 (Discharge w/4.03% retention)	0	2,835,979
BAT/NSPS Option 2 (Discharge w/3.82% retention)	(359,733)	2,677,094
Zero Discharge of SBF-wastes	(14,241,500)	(3,163,627)

N/A - Not Applicable (as these regions currently do not allow SBF discharges)